Business Manager
B. Brittain Wilson

Publisher
Edward Lyman Bill

INDIA RUBBER WORLD

Editor
S. C. Stillwagon

Assistant Editor
Edward V. Osberg

Volume 98 | September 1, 1938 | Number 6

Contents

Articles

		Pages
CONTRIBUTORS TO RUBBER COMPOUNDING PROGRESS	*S. C. Stillwagon*	29
DISTRIBUTERS' TIRE STOCKS IN THE UNITED STATES, JULY 1, 1938		34
LATEX PATENT DECISION AFFIRMED		35
PNEUMATIC TIRES—II	*Ralph F. Wolf*	37
PHYSICS OF RUBBER AS RELATED TO THE AUTOMOBILE—II	*W. F. Busse*	42

Departments

	Pages
Editorials	46
What the Rubber Chemists Are Doing	47
New Machines and Appliances	49
Goods and Specialties	51
Rubber Industry in America	52
Financial	52
Obituary	54
New Incorporations	55
Rubber Industry in Europe	61
Far East	63
New Publications	65
Book Reviews	66
Rubber Bibliography	66
Patents	67
Trade Marks	70
Legal	35, 70
Foreign Trade Information	80
Rubber Trade Inquiries	82
MARKET REVIEWS	
Crude Rubber	71
Compounding Ingredients	73
Cotton and Fabrics	76
Rubber Scrap	78
Reclaimed Rubber	78

Departments

	Pages
STATISTICS	
London and Liverpool Stocks	78
Malaya, British, Exports and Imports	80
United States and World, of Rubber Imports, Exports, Consumption, and Stocks	78
for May, 1938	82
Imports by Customs Districts	82
Crude and Waste Rubber, for 1938	80
Production, Rubber Goods	82
Tire	78
Reclaimed Rubber	78
World and United States, of Rubber Imports, Exports, Consumption, and Stocks	78
Net Imports of Crude Rubber	76
Shipments of Crude Rubber from Producing Countries	80
Tire, Auto, Exports, Principal	82
CLASSIFIED ADVERTISEMENTS	79
ADVERTISERS' INDEX	94

Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Cable Address, ELBILL, New York. Subscription $3.00 per year postpaid in the United States and Mexico; $3.50 per year postpaid to Canada; $4.00 per year postpaid to all other countries.

A BILL BROTHERS PUBLICATION

Other Bill publications are: *Premium Practice, Rug Profits, Sales Management, Soda Fountain,* and *Tires.*

Copyright, September 1, 1938
Bill Brothers Publishing Corp.

WHAT'S YOUR TROUBLE TODAY

Is it going to be scorching in September?

If so, try replacing part or all of your accelerator with **ALTAX.**

We believe the ideal acceleration is a variable ratio of **CAPTAX** and **ALTAX;** and when **ALTAX** predominates, activate for faster cure, if needed, with a little **TUADS** or **ZIMATE.**

R. T. VANDERBILT CO., 230 Park Avenue, New York, N. Y.

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 98 **New York, September 1, 1938** **Number 6**

Contributors to Rubber Compounding Progress

The du Pont Rubber Laboratories

S. C. Stillwagon

THROUGHOUT the past decade the facilities for technical research and development in the rubber industry have grown remarkably. Great strides have been made in testing equipment and methods to enable the interpretation of laboratory results in terms of practical evaluation of rubber products.

When the du Pont rubber laboratory was first established in May, 1922, its staff consisted of one chemist whose time was divided between chemical research on accelerators and experimental compounding to determine the value of his new products. One routine assistant did the mixing, curing, testing and, calculating of results. From this small beginning 16 years ago, there has grown the three coordinated organizations that now constitute the du Pont rubber laboratories with a total personnel of approximately 100. Chemical research is conducted by the Rubber and Neoprene Divisions of du Pont's Jackson Laboratory with a staff of 13 graduate chemists and a number of assistants. Three adjoining buildings house the rubber compounding laboratory with a staff of ten rubber chemists, one physicist, and 41 assistants and clerks. The functions of this organization include control of quality of du Pont products, compound development and research on Neoprene and rubber, and technical service to consumers of Neoprene and du Pont rubber chemicals. The third branch of the organization is the Neoprene control laboratory staffed with three graduate chemists and 20 routine assistants engaged in maintaining analytical controls on the various steps of the Neoprene process and checking the properties of each finished batch by vulcanization tests.

Jackson Laboratory of Organic Research

Jackson Laboratory

A complete description of this laboratory, named after an early du Pont director of research, is beyond the intended scope of this article. In connection with the preparation of rubber test pieces the visitor is impressed by the miniature compounding equipment in use here. Experimental batches are compounded on a small mill with rolls six inches in length and two inches in diameter; power is supplied by a ½ h.p. motor. A miniature internal mixer, also powered by a ½ h.p. motor, is used for certain types of compounding; the mixing chamber dimensions are three by four by three inches, and there are two blades, one revolving at 18 r.p.m., and the other at 23 r.p.m. A miniature single-opening press, insulated with transite, has a 7½-inch square platen which is raised or lowered by an air-operated ram. Other interesting pieces of equip-

ment include the Williams pendulum plastometer, the design and operation of which have been described previously.[1] There is also a precision high-temperature oven for aging Neoprene at temperatures up to 200° C. in which the temperature can be controlled within ±1° C. On the other end of the temperature scale is a refrigerated cabinet for studying the effect of temperatures as low as —60° C. These special "tools" together with the variety of stills, autoclaves, and other apparatus found in most chemical laboratories are used in the development of new accelerators, antioxidants, peptizing agents, etc., as well as new types of Neoprene.

Rubber Compounding Laboratory

This laboratory is divided for administrative purposes into four divisions: namely, the processing, routine physical testing, latex compounding, and special testing divisions. It occupies a group of three adjoining buildings having a total floor space of approximately 12,000 square feet. No attempt will be made to describe the laboratory equipment and testing methods in detail since a great deal of the equipment is the conventional type, and A.S.T.M. procedures are used for all operations that have been standardized by the Rubber Committee (D-11).

Processing Division. Processing starts in the stock room, in which are stocked all rubber compounding ingredients and supplies except inflammable solvents which in safety cans are stored in an isolated location. Rubber is kept in airtight containers to avoid contamination. Some indication of the number of materials used in rubber compounding may be gained from the fact that 649 different items are carried in stock, not including various grades and brands of each product.

Adjoining the stock room is the compounding room equipped with weighing tables having non-corrosive metal tops and having beneath them dustproof bins for storing pigments and fillers. Analytical balances are used for all weighing under 15 grams, and automatically registering precision scales for larger weights.

The mill room contains one 30-inch mill which is used to prepare master batches and to study milling characteristics of Neoprene and rubber stocks. It is also used in the evaluation of peptizing agents. When it is desired to mix larger batches, recourse is had to standard 60-inch mills in the rubber dispersed color plant located near by. For routine mixing of experimental batches there are five six- by twelve-inch smooth roll mills and one eight- by sixteen-inch mill. In addition there are two six- by twelve-inch corrugated roll washers, a six- by twelve-inch three-roll calender, and a standard No. 1 Royle tuber. Some of the mills are equipped with hoods for forced draft ventilation. All of them are piped for cold water, 50° C. water, 70° C. water and steam. The 50° and the 70° C. water are supplied by centrifugal pumps in the feed line from thermostatically controlled supply tanks.

The temperature of one of the six- by twelve-inch mills is regulated by a thermocouple on the back roll which is connected to a photo-electrically operated potentiometer which regulates the flow of steam or water as required to maintain the desired temperature. One of the six by twelve mills, used exclusively for mixing colored stocks, is located in a separate room for the sake of cleanliness. Some mills have a two-faced center guide, making possible mixing two batches simultaneously on the same mill.

The vulcanization equipment consists of five single-opening and two double-opening hydraulic steam platen presses ranging in size from 18 inches to 30 inches square. Steam is available at a line pressure of 125 pounds per square inch. All presses are equipped with dual temperature regulators in addition to the standard industrial thermometers, steam pressure gages, and recording thermometers. Before the steam enters the platens, any condensate present is removed by a water separator on the main line and also by bleeders on the press manifolds. Besides there are the usual bleeders on the individual platens and the conventional steam trap on the outlet. One press piped for 50° C. and 70° C. circulating water is used for studying low-temperature cures and running scorching tests.

In order to maintain comfortable working conditions all of the presses have hoods equipped with suction fans to evacuate hot air and steam. All presses are, of course, equipped with shields to prevent drafts across the platens which would affect the temperature.

The most unusual piece of equipment in this division of the laboratory is an all-purpose jacketed autoclave, designed by du Pont, which may be used for curing in water, steam, air, ammonia, nitrogen, carbon dioxide, etc. The inside dimensions are three by four feet. Positive circulation of air or other gases is obtained by means of a high capacity fan mounted on top of the autoclave and connected to it with heavily insulated eight-inch pipes which take the gases from the rear and force them into the front of the vulcanizer. Baffles at the front and the rear distribute the gases uniformly and prevent dead spots. The apparatus is equipped with standard precision pressure, temperature and time control devices, together with the usual recording thermometer, industrial thermometer and pressure gages. In addition it is fitted with six thermocouples which may be used to check the temperature at any spot in the autoclave and also to determine the temperatures of test specimens when this apparatus is used for the air pressure heat test.[2]

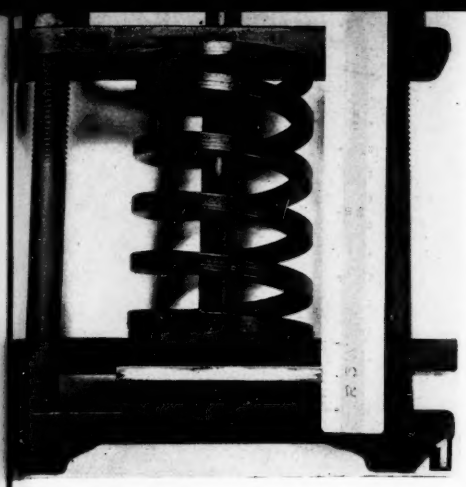
The tubing machine is equipped with an insulating head and with a variable speed take-off cable so that insulated wire may be taken off either in pans or in 150-foot lengths. This take-off mechanism is used in preparing samples for the high-pressure curing apparatus which was developed by Kemp and Ingmanson at the Bell Telephone Laboratories[3] and is used in the development of continuous curing wire insulation compounds.

Routine Physical Testing Division. This branch of the rubber compounding laboratory conducts the conventional physical tests for tensile strength, permanent set in compression and extension, hardness, resilience, resistance to flex cracking, abrasion resistance, T-50 value, etc. Most of the equipment is housed in a constant temperature testing room 20 by 40 feet which is maintained at 82° F.±2°. In view of the importance of constant and close attention to the details of physical testing, this room is finished in acoustic plaster to reduce noise fatigue. Experience has shown that the more common routine physical tests can be conducted with greater accuracy by girls than by young men; specially trained high school graduates are used.

The sample preparation equipment consists of a U.S.M.C. clicking machine and dies for cutting out samples, buffing machine, bench marking dies, etc. Tensile testing equipment consists of two standard Scott machines with compensating head and spark recorder and a third Scott machine equipped with a tank for testing at higher or lower temperatures.

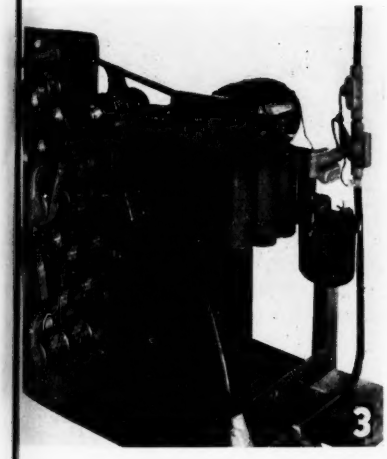
Standard A.S.T.M. methods and equipment are used for permanent set under tension and compression. Resilience is tested on a Schopper rebound tester and a Bashore resiliometer. In the development of stocks for truck tires, fan belts, and other purposes where low heat build-up is required, the Goodrich flexometer is used. The T-50 equipment is of the conventional type as developed

[1] *Ind. & Eng. Chem. (Anal. Ed.)*, 8, 304 (1936).
[2] A.S.T.M. Designation D454-37T.
[3] *J. Ind. Eng. Chem.*, 29, 782 (1937).

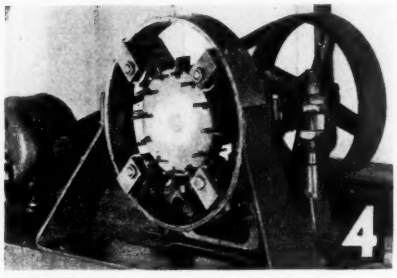


1. Compression Set Apparatus

2. Administration Building



3. DuPont-Fisk Flexing Machine

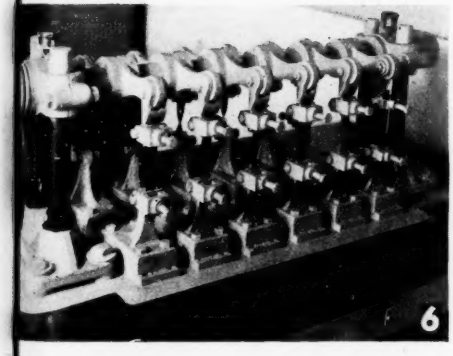


4. Mason Flexer

5. Sole Flexer

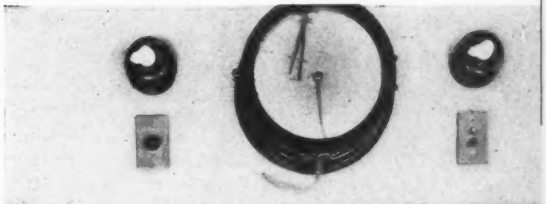
6. "Duol" Flexer

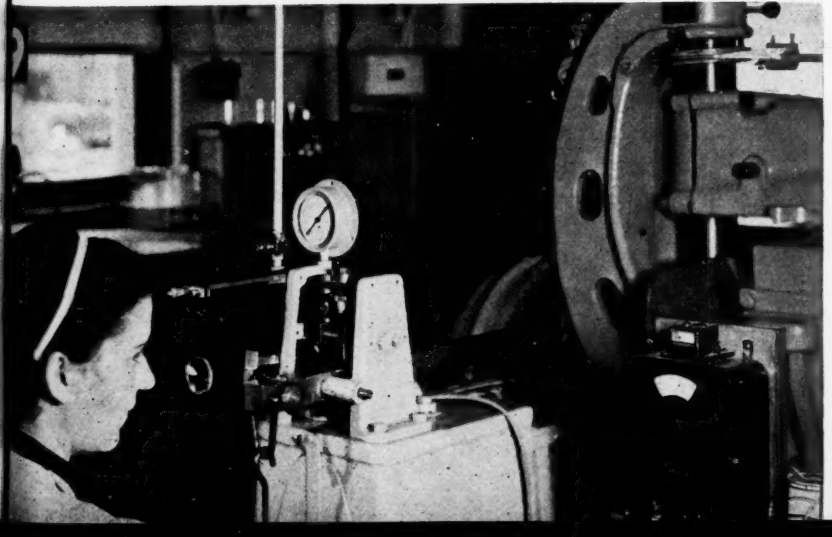
7. U. S. Rubber Flexer

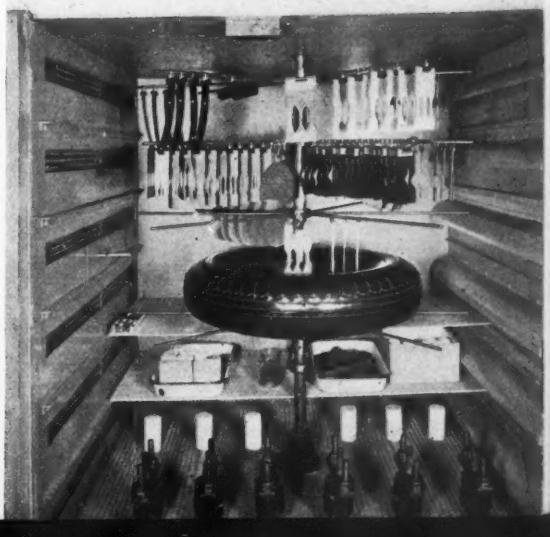


8. Geer Oven

9. Goodrich Flexometer







by the U. S. Rubber laboratory. For abrasion testing there are a number of standard du Pont (Williams) abraders and a U. S. Rubber type of abrader made by Scott Co. For tear testing, the Winkelmann method is used with a modified test specimen cut with a die designed by du Pont which provides ends of greater length that are easily held in the standard jaws of the Scott tensile tester.

Several types of flexing machines are used, depending upon the type of service for which the stock is intended. The machine most frequently used is the type originated by the Fisk rubber laboratory and later standardized by du Pont.[4] Also in use is the U. S. Rubber flexing machine principally used for ply separation tests on pneumatic tire carcasses, transmission belts, etc., and at times for tread flexing.[5] Besides these flexing machines there is a so-called "duol" flexer which flexes dumbbell test strips, given a half twist, at the rate of 300 cycles per minute. The Mason-type tread flexing machine is also used as a check on the others, and the Endicott-Johnson type of sole testing machine is used on rubber shoe soles.

Aging ovens are located in a separate room. All ovens are designed for specific purposes and are built in the Experimental Mechanical Division of Jackson Laboratory. A special feature of these ovens is forced circulation of hot air over external heating coils thermostatically controlled by sensitive deKhotinsky regulators which operate a small heating element supplementary to a higher capacity and continuous heating element. The largest oven, approximately four by four by four feet, is used for aging at 70° C. The circulated air, which is drawn out of one end of the oven and into the other through baffles at both ends, provides constant temperature. As a further precaution against local temperature variations, the oven is fitted with a revolving rack on which the samples are placed. Several tires may be aged simultaneously, together with a larger number of conventional test samples. A second oven, used for dry heat curing, may be heated at any predetermined rate of rise to any desired curing temperature. Another oven, used principally for Neoprene aging, operates continuously at 100° C. A fourth oven is operated continuously at 49° C. (120° F.) and is used for conducting bin curing tests on mixed stocks. Another oven is available for tests on special stocks at non-standard temperatures. The oven room also contains an especially designed Williams plastometer built into an oven held at 80° C. and operated without exposure of samples to drafts.

In addition to oven aging tests a great deal of age testing is done on samples that have been stored in the dark at 82° F. and on samples that have been exposed to the weather on the roof. The sunlight resistance of rubber and of Neoprene is tested in an humidified Atlas Fade-O-Meter. However, great reliance seems to be placed on outdoor exposure tests which are conducted either on the roof of the laboratory building or, more frequently, at the Hialeah (Fla.) exposure test station which is operated by du Pont's Finishes Division for the benefit of all branches of the du Pont company that are concerned with sunlight deterioration. Tests conducted here are usually static, although dynamic sun-checking tests on gasoline hose, for example, are also made at this point.

Another room in the routine testing division is used for solvent or other tests which involve the hazard of corrosive or flammable vapors. This room is equipped with transite and stone hoods from which the vapors are drawn through a lead lined, forced draft stack and is also used for making cements and for sulphur chloride curing, which is carried on in a specially designed oven.

Latex Compounding Division. This branch of the laboratory is equipped with conventional equipment such as high-speed mixers for stability tests, viscosimeters of the Stormer and Oswald type, ball and pebble mills, and a Charlotte colloid mill for making dispersions. Rotating shafts for preventing settling during storage of the dispersions are also part of the equipment. On one dipping machine the form is lowered into the latex bath, and on another the bath is raised by hydraulic ram around the form.

Special Testing Division. This branch of the laboratory is devoted to the development of testing equipment to measure the mechanical properties of rubber and Neoprene which are of especial interest to engineers in the rubber consuming industries. An example of this special equipment is the oscillograph[6] which measures the resilience, vibration absorption, drift and permanent set of rubber under dynamic conditions. Other apparatus has been developed and is used in this laboratory for studying the extraction of rubber and Neoprene in volatile liquids and gases under pressure and for measuring the diffusivity of liquids and gases through Neoprene and rubber. Another ingenious device is used for research on adhesion of rubber or Neoprene vulcanized to metals under controllable conditions of flow and pressure. In this division is housed the electrical testing equipment including a 5 K.V.A. test set for measuring dielectric strength which has a continuous range of 250 to 50,000 volts. Specific inductive capacity and power factor are measured over a frequency range of 200 cycles to eight kilocycles. The conventional galvanometer method is used to measure DC resistivity.

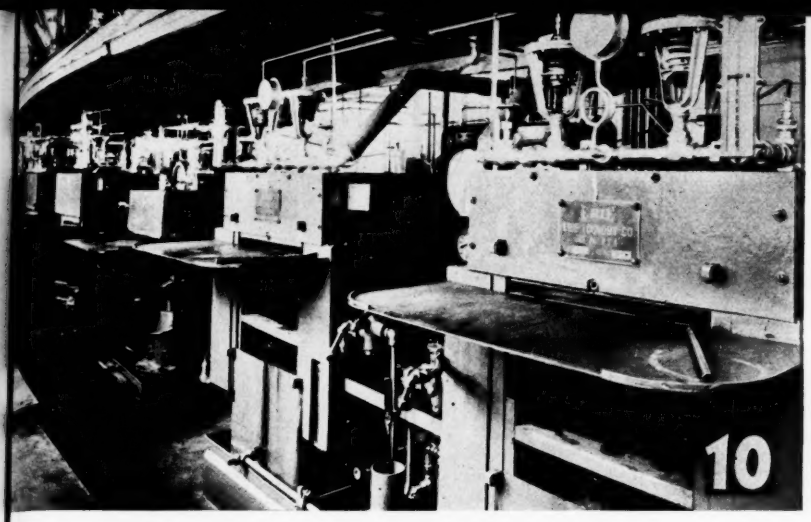
The oxygen bomb aging equipment is located in a small cell adjoining the special testing laboratory for convenience of supervision by the mechanical staff. It consists of two jacketed bombs, each 8⅝ by 36 inches inside dimensions, heated by circulating, thermostatically controlled hot water. These bombs were designed and built by du Pont. The A.S.T.M. test method D428-36T is used.

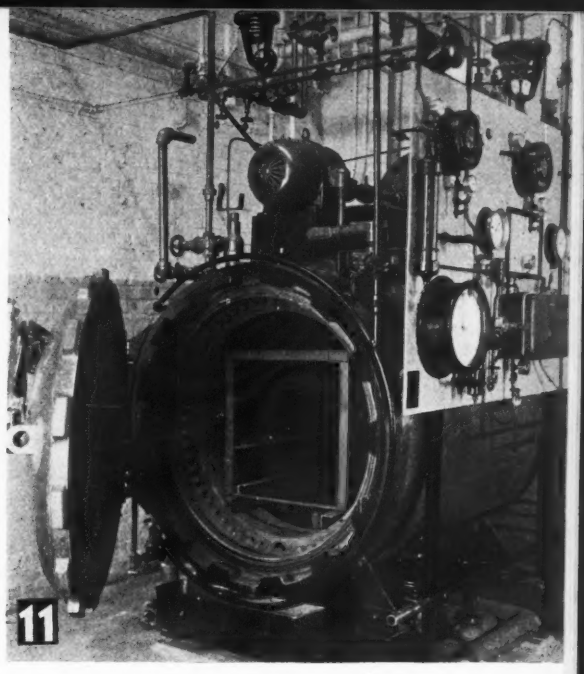
Neoprene Control Laboratory

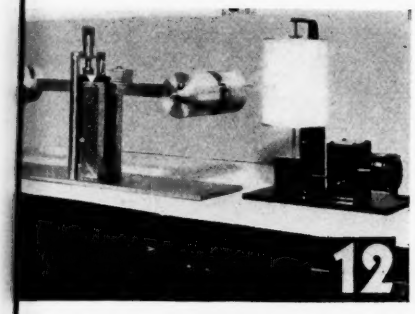
The Neoprene control laboratory, 96 by 40 feet in size, located near the Neoprene plant, but at some distance from the other laboratory buildings, contains equipment for the analytical control of the various steps in Neoprene manufacture, including special precision gas analysis equipment. This laboratory is also provided with standard laboratory equipment for mixing, vulcanizing, and testing each batch of Neoprene as it is produced. Tests applied here in a constant temperature room include plasticity tests, stability tests on compounded and uncompounded Neoprene, and stress-strain tests on vulcanized samples.

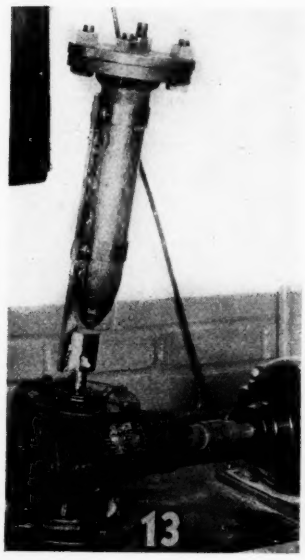
In conclusion it may be worthy of note that throughout the du Pont laboratories the old "tooth and nail" tests still seem to be held in high regard. In addition to the modern mechanical tests experimental stocks are always subjected to these old-fashioned hand tests, results of which are recorded along with tensile strength, modulus, elongation, heat and abrasion resistance, and other machine test results. There is an obvious tendency to distrust violently accelerated tests such as the air-pressure heat test and to base conclusions on the slower tests which may more nearly approach actual service conditions. A predominant volume of age testing is being done in cabinets at room temperature and on outdoor exposure racks. Great stress is placed on the use of special machines to simulate operating conditions. For example, gasoline hose is tested for flex resistance on a machine that closely duplicates the action the hose gets when installed on a gasoline pump. In general there is a determined effort to devise laboratory tests that are directly related to the things that happen to a piece of rubber or Neoprene after it gets out on the job.

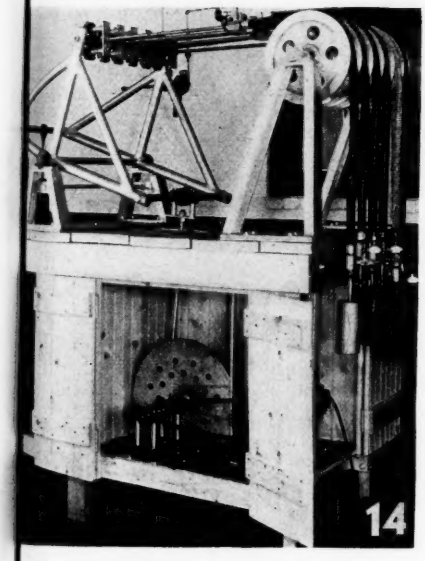
[4] Method C, A.S.T.M. Designation D430-35T.
[5] Method A, A.S.T.M. Designation D430-35T.
[6] *Ind. Eng. Chem. (Anal. Ed.)*, 9, 393 (1937).











10. Press Room

11. Universal Autoclave

12. Compression Oscillograph

13. Special Agitation Apparatus

14. Hose Flexing Apparatus

15. Rolling Apparatus for Water Dispersions

16. Roof Exposure Tests

17. Miniature Mill

Distributers' Tire Stocks

In the United States, July 1, 1938[1]

THE results of the quarterly survey of retail stocks of automobile tires and inner tubes, as of July 1, 1938, are shown below in comparison with summary data for preceding surveys, the bases and methods described in previous reports having been used in calculating the stocks held by the following three groups of distributers: 1. Dealers holding over 100 casings each on April 1, 1937. 2. Distributers through oil-company chains and some independent filling stations. 3. Manufacturer-owned, mail-order house, and other large retail chains.

The following summary table covering estimated total stocks held by each group of distributers in surveys made since 1936 shows total stocks of casings on July 1, 1938, lower than a year earlier, but higher than at other survey dates since July 1, 1937. Stocks held by dealers, however, are lower than in any preceding survey; oil-company distributers' stocks are higher than at any date shown except January, 1938; other mass distributers' stocks in the aggregate are about average, but have increased over January and April of this year.

	Thousands of Casings			
1936	Dealers	Oil Companies	Other	Total
April 1	2,321	1,543	1,890	5,754
October 1	2,179	1,757	2,110	6,046
1937				
April 1	2,465	1,853	2,304	6,622
July 1	2,161	1,996	2,299	6,456
October 1	1,929	1,774	2,289	5,992
1938				
January 1	1,938	2,115	1,920	5,973
April 1	1,932	1,869	2,051	5,852
July 1	1,778	2,079	2,156	6,013

Total stocks of inner tubes shown below are at record low levels, each group of distributers reporting lower stocks than on July 1, 1937.

	Thousands of Inner Tubes			
1936	Dealers	Oil Companies	Other	Total
April 1	3,000	2,040	1,902	6,942
October 1	2,710	2,097	2,228	7,035
1937				
April 1	3,155	2,019	2,170	7,344
July 1	2,602	1,960	2,129	6,691
October 1	2,268	1,957	2,038	6,263
1938				
January 1	2,280	2,127	1,717	6,124
April 1	2,585	1,918	1,728	6,231
July 1	2,289	1,805	1,782	5,876

These surveys do not cover stocks of casings and inner tubes held by small dealers; the number of casings held by such dealers is estimated by trade statisticians to range between one million and one-and-a-quarter million, at different seasons. Indications based on returns from dealers shown below would be that small dealers' stocks were at a low point on July 1, 1938.

The following table compares the stocks reported by 963 dealers for 1,296 stores in the current survey, with the stocks reported by the identical firms a year earlier. The reports are assembled in three groups, each showing reduced stocks this year, both of casings and inner tubes, with the greatest decline in the stocks of the smaller dealers. The index numbers shown below reflect this decline, which is carried into the summary estimates above. Slightly lower July 1 index numbers and total dealers' stocks were indicated by comparison of reports received both in April and July, 1938, but the number of comparable reports was less than for the July-July comparison.

Through the cooperation of the National Association of Independent Tire Dealers we circularized its membership, and returns from firms not previously on our mailing list, together with those on the former list, but which did not report in July 1937, numbered 825, covering 1,197 stores; the average stock per dealer is higher for casings (but lower for inner tubes) than for dealers discussed in the preceding paragraph.

Considering the size of the present mailing list and the average stocks per dealer reporting, there is reason to believe that summary estimates of dealers' stocks shown above are perhaps somewhat under-estimated on all dates, and that fluctuations in volume of total dealers' stocks have been slightly greater than indicated.

Number of Casings July 1, 1938	Number of		July 1, 1937		July 1, 1938	
	Dealers	Stores	Casings	Tubes	Casings	Tubes
Under 200	640	757	92,451	113,813	67,134	93,245
200 to 499.....	235	387	92,057	111,896	71,333	90,365
500 and over...	88	152	129,855	156,239	120,460	148,587
Total	963	1,296	314,363	381,948	258,927	332,197
Other July, 1938.	825	1,197	.....	.....	250,923	282,573
Total July, 1938	1,788	2,493	.....	.....	509,850	614,770
Index Numbers			96.1	115.6	79.0	101.6

Reports were received from 43 firms distributing tires through chains of filling stations. Some reports covered stocks held in central warehouses only; while others covered stocks held in retail outlets. A comparison of stocks reported by 30 identical firms in the April and July surveys, reporting 673,460 casings April 1, against 749,706 on July 1, indicates the increase from April 1 to July 1 in oil company stocks of casings, which, with a decline in inner tubes, has been recorded in the index numbers below and reflected in the summaries of the table above.

Actually Reported Stocks	April 1	July 1
Number of firms.....	63	43
Casings	771,897	1,215,849
Inner tubes	792,289	1,059,213
Index Numbers:		
Casings	113.1	126.0
Tubes	116.2	109.4

Reports were received from seven tire manufacturing companies covering stocks held in company operated retail outlets, and from six other mass distributers covering their total stocks on hand as of July 1. Stocks reported here by manufacturers are presumably mostly also included in manufacturers' inventory as reported by The Rubber Manufacturers Association, Inc. The number of stores reported by tire manufacturers for July was 2,133; other firms, 1,841. Reported stocks of both casings and inner tubes were increased somewhat. Both the April 1 and the July 1 reported statistics under this heading cover all the important chain-store distributers of tires and, consequently, were included in the summary 100% estimates without change.

(Continued on page 41)

[1] Special Circular No. 3,683, Rubber Section, Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Latex Patent Decision Affirmed

IN THE September and October, 1937, issues of INDIA RUBBER WORLD *we published in full the judge's decision and discussion relating to the suit United States Rubber Co. vs. Sidney Blumenthal & Co., Inc., heard in the District Court of the United States, District of Connecticut. In that decision given on August 10, 1937, Judge C. C. Hincks held that the Blumenthal company was not infringing the Gibbons patent and that the Hopkinson patent and the Foster and Cook patent with respect to the claims at issue, were both invalid.*

As the result of an appeal by United States Rubber Co., Judge Manton L. Hand and Augustus N. Hand of the United States Circuit Court of Appeals for the Second District handed down a decision on August 4, 1938, declaring all three patents invalid. The verbatim decision after the appeal is published herewith.

UNITED STATES CIRCUIT COURT OF APPEALS
FOR THE SECOND CIRCUIT
UNITED STATES RUBBER COMPANY,
Complainant-Appellant,
AGAINST
SIDNEY BLUMENTHAL & CO., INC.,
Defendant-Appellee.

Before:
MANTON L. HAND AND AUGUSTUS N. HAND,
Circuit Judges.

Appeal from United States District Court for the District of Connecticut.

Suit for infringement of U. S. patent No. 1,654,167 to Gibbons, U. S. patent No. 1,784,523 to Hopkinson, and U. S. patent No. 1,816,574 to Foster and Cook. A decree was entered for the defendant holding the Gibbons patent not infringed, the Hopkinson patent invalid for want of patentable invention as to claims Nos. 1, 2, 3, 4, 5, 6, 7, 12 and 13, and the Foster and Cook patent No. 1,816,574 invalid for want of patentable invention as to all the claims at issue, to wit: Nos. 1, 2, 3, 5, 6, 7, 8, 10, and 11. From the decree the complainant appeals. Affirmed.

Gifford, Scull & Burgess, Solicitors for Complainant-Appellant; Newtown A. Burgess and Henry M. Leigh, Counsel.

Daggett & Hooker, Solicitors for Defendant-Appellee; E. Clarkson Seward, W. Saxton Seward and David L. Daggett, Counsel.

AUGUSTUS N. HAND, *Circuit Judge:*

The three patents in suit relate (1) Gibbons to the process of manufacturing vulcanized rubber compositions, (2) Hopkinson to the coating of various fibrous materials with latex compositions, and (3) Foster and Cook to the application to needled pile fabric of latex compositions such as those described by Gibbons and Hopkinson.

Gibbons Patent No. 1,654,167

The patent to Gibbons is particularly for a process of vulcanization where the vulcanizing ingredient or agent is combined with latex. Gibbons' only claim reads as follows:

"Process of manufacturing vulcanized rubber compositions which comprises the drying and vulcanization of substantially uncoagulated rubber latex containing an organic accelerator capable of effecting vulcanization at temperatures below those ordinarily employed in hot vulcanization methods."

Although Judge Hincks, who tried the case in the District Court, simply held that the Gibbons patent was not infringed, we think it unnecessary to deal with the difficult and controversial matters involved in that conclusion because we have no doubt that the patent is invalid for lack of invention.

The Italian patents to Bruni granted in 1919 set forth a "process for the vulcanization of rubber or of objects made of natural or synthetic gum elastic (rubber), or of any nature whatsoever." The pertinency of the reference is criticized because Bruni specifies only rubber and not latex in his patents and mentions only one class of accelerators, the dithiocarbamates, referred to by Gibbons. But latex is defined in the Hopkinson patent in suit as "the natural salt water emulsion of rubber obtained from the rubber trees" and is described as "rubber in the form of latex" in all four examples of the Gibbons process given by him in his specification.

Bruni's patents employed one of the classes of accelerators described by Gibbons, and it is stated in the Bruni patent No. 173,364 that one of the advantages of the Bruni process is "vulcanization at temperatures which are much lower than those customarily employed for the vulcanization in the hot, for instance, at temperatures below 100°." The temperature mentioned is according to the centigrade scale and equals 212° F. referred to as a desirable low temperature in Examples 1 and 4 of the Gibbons patent.

Bruni says nothing about drying, but about vulcanizing at a suitable temperature which would produce drying. Thus he does not disclose the two separate steps of first drying and then vulcanizing which complainant argues with much difficulty are the features of the Gibbons process and which the court below found were not separate but concurrent.

Judge Brewster truly said in *Vultex Corp. v. Heveatex Corp.*, 19 F. Supp. 327,330:

"It would seem to be obvious to any chemist, endowed with a reasonable knowledge of the art of vulcanizing rubber, that the cold vulcanizing process, well-known in its application to dry rubber, could likewise be applied in a process of vulcanizing of latex. This, in my opinion, would not amount to a patentable discovery."

We can see no room for Gibbons' process as a new invention after Bruni.

If, however, complainant is right and there is a distinction between Bruni and Gibbons due to its construction of the latter's claim that drying must precede and not be concurrent with vulcanization, this process was disclosed in U. S. patent No. 1,605,649 to Curtis. That patent clearly anticipates Gibbons unless the latter carried back his invention to an earlier date than Curtis. Curtis describes a process of drying and then vulcanizing. He says:

'As an example a piece of haircloth may be immersed in rubber latex of 25% rubber solids and containing curing ingredients embodying low temperature curing accelerators. After drying the cloth may be allowed to cure at

ordinary temperatures, or the cure may be hastened by heat, but the temperature should not be raised to such a point as to injure the hair, and it has been found that temperatures from 150° to 200° F. are suitable. One means of carrying out the above is to employ latex which contains 1 part of zinc dimethyldithiocarbamate, 1 part of zinc oxide and 3 parts of sulphur on 100 parts of rubber. Haircloth impregnated with this mixture and dried will vulcanize satisfactorily overnight at 150° F. or in 2 hours at 200° F."

The failure of Curtis to claim Gibbons' invention can make no difference if he disclosed the invention in his application as he did. *Milburn Co. v. Davis, etc., Co.*, 270 U. S. 390. We are satisfied that Gibbons' date of invention was not carried back of his filing date which was six months later than that of the Curtis application. This is in accordance with the express finding of the court below. Gibbons testified that the best description of his process in his notebook is on page 45. It indicates that September 9, 1919, he impregnated cotton fiber with latex, that the fabric was dried overnight and then vacuum dried one-half hour at 40 pounds steam pressure, i.e., at 287°. This temperature was far above 240° which was shown by complainant's expert to be the low limit of hot vulcanization.

In another test the same day Gibbons vulcanized at a temperature of 286° F. On September 19 the notebook refers to a temperature of 230° F., and on November 11 of 220°. On the earlier date the entry states that the mix "did not cure well" and, on November 20, that paper dipped in latex and cured in hot air "did not appear very interesting." Moreover, on September 16, the notebook reads:

"On account of the property of curing at low temps possessed by above it was decided to use a different latex mix which would not vulcanize at say 212—thus enabling us to dry at 212°."

It is evident from the foregoing that Gibbons regarded curing at low temperatures as unsuccessful and that he never produced a useful article cured at such temperatures—in other words, that his experiments along that line were failures and for an indefinite period were abandoned. Indeed, his main effort seems to have been to satisfactorily impregnate the fibers of his textiles with latex rather than to vulcanize at low temperatures. There is no satisfactory proof that he ever reduced his invention to practice before the date of the application for his patent.

Moreover, the fact that for more than four years after September, 1919, when he claims to have made his invention, he filed no application to obtain a patent for his process convinces us that he did not make the invention in 1919 and is entitled to no date earlier than that of his application. It is quite impossible to carry back an invention by any such inconclusive proof as Gibbons has furnished when the burden of antedating an application is so heavy. We hold that in view of the Curtis patent the Gibbons patent is void for lack of invention.

Hopkinson Patent No. 1,784,523

Various claims of the Hopkinson patent are in issue, but Claim 2 is sufficiently illustrative, which reads as follows:

"The method of making rubberized articles of fibrous material which comprises superficially coating normally penetrable fibrous material with a thickened and compounded water emulsion of rubber without substantial penetration of the material, and drying, thereby attaining a minimum loss of flexibility."

The patentee calls attention to the fact that in certain articles of manufacture such as rubber tires great strength is obtained by impregnation and the loss of flexibility is not objectionable. But he goes on to say that in other articles such as waterproofed clothing, rubberized fabric, gloves, bathing shoes, and light overshoes impregnation and loss of flexibility are highly objectionable. He says that by using a thickened latex for the coating it may be applied without a substantial penetration of the fibrous material and that in all cases the consistency of the compound should be such that substantial penetration will not occur. He adds that he employs approximately 50% of solid content in his mixture, gives several formulae for compounding it, and sets out the coating and vulcanizing process. Finally he says that his process secures a strong bond between the coating and material without substantial penetration of the fabric.

Hopkinson's thought was to employ a latex compound sufficiently thick to avoid much penetration and sufficiently thin to secure a strong bond. Morisse in "Le Latex" published in 1908 showed that a thick latex would not penetrate fabric sufficiently for his purpose, which was for making automobile tires that would not blow out as a result of the loosening of the rubber from the fabric. He says:

"At first I thought that it was necessary to use a thickened latex, namely one which had been thickened by special centrifugation. The rubber 'cream' thus obtained was spread on the fabric like a sort of shoe polish and the fabric was set aside so that evaporation could take place. This process is not at all practical. As a matter of fact, the rubber does not sufficiently penetrate the fabric; it separates easily and it therefore does not adhere well."

As we have already noted, Hopkinson himself stated in his specification that penetration of the latex compound is necessary for making strong tires. Morisse fully understood and in his publication disclosed the fact that latex will penetrate fabrics, but that concentrated latex will not do this to any substantial extent. In the French patent of 1909, No. 398,705, reference is made to mixtures of latex prepared under patents of Morisse having a proportion of 40% gelatine and 60% Hevea latex. It teaches that this mixture when vulcanized will make an "elastic sheet." It is true that nothing is said about how to apply the compound or to avoid penetration, but the instruction as to how to make a thickened mixture and the result claimed to follow would seem to indicate that the French patentee was doing much the same thing that Hopkinson's patent discloses.

Manufacture under the British patent to Hancock and Silver A. D. 1864, No. 3110, is said to produce "flexible elastic waterproof articles." That patent discloses a process similar to Hopkinson's for making a latex compound for the manufacture of "flexible elastic waterproof articles." U. S. patent No. 1,523,821 to McGavack also describes concentrating latex to a percentage of 65% solids. The compound was for coating fabrics and might be applied in the way described by Hopkinson.

It seems evident that the desirability of having the latex compound penetrate the fabric deeply or not substantially depends on the nature of the fabric or the use to which the product is to be put. In view of the general state of the art it seems reasonable to suppose that the idea of Hopkinson has for years been in the minds of men manufacturing rubber coatings. Certainly Morisse understood it when he found a thick solution of rubber inapplicable to tires where a maximum of penetration is necessary to prevent them from blowing out. He must have known that a considerable concentration would furnish a super-

(*Continued on page* 41)

Pneumatic Tires—II

A Chronicle of Interesting Happenings in the Early Days of the Casing Industry

Ralph F. Wolf [1]

INCIDENTS and historical data related to the conception and invention of the pneumatic tire for bicycles were covered under Part I in our August issue. This development was destined to expansion as a partner to the automobile, each being dependent upon the other. Part II, in this issue, tells of the formation of companies for manufacturing bicycle tires and the adaptation of the air cushioning principle for the automobile in its early development.

First Manufacture of Pneumatics

So satisfied were the Edlins with the machine that they began the manufacture of bicycles suitable for the new tires. In the *Irish Cyclist* for December 19, 1888, appeared the first pneumatic advertising in history. "Look out for the New Pneumatic Safety. Vibration impossible. Sole makers—W. Edlin & Co., Garfield Street, Belfast."

Editors of that day apparently had little respect for their advertisers. The paper greeted the announcement with considerable hilarity, its Hibernian wit rising to the heights of "We note the advent of a new Pneumatic—News room attic—bah—a new Pneumatic Safety. 'Pneumatic.' Something to do with air, isn't it? Quite right, too, we like to see new ideas well ventilated. Happy thought. We hear of draught horses. Perhaps the Pneumatic may be a draught bicycle."

Even better advertising was the fact that Edlin, who rode a pneumatic tired bicycle to work, was constantly being warned by the police for breaking the speed limit.

No less a personage than William Hume, captain of the Belfast Cruisers Cycle Club, after having several trial runs, was the first to order a pneumatic. At the Belfast Queen's College Sports on May 18, 1889, Hume rode his safety bicycle equipped with pneumatics. The small machine was conspicuous among the high-wheeled racers; became more conspicuous as the dashing Cruisers' captain flashed home first in every event. Dunlop, sitting in the stands, is authority for the statement that he heard an English bookie shouting, "There is a demon in that machine." This, to the mind of the author, is extremely moderate language for a bookie of any nationality and worthy of commendation.

Caricature of Dunlop*

Other sensational victories followed. James MacCormack, mounted on pneumatics, swept every event at a meet on the Portadown cinders. Dublin men laughed at the idea until their Belfast rivals began "clearing the boards" at every meeting. Present at the Queen's College meeting were Harvey DuCros, Dublin paper merchant, and his six sons. DuCros was an athlete of considerable note in his time, a great fencer and runner and once a lightweight boxing champion. The six brothers were among the best cyclists of the time and attended all of the big meets. Hume's triumph greatly impressed DuCros, and he was not long in seeking an introduction to Dunlop.

Formation of First Tire Company

The veterinary, about to retire from his practice, had decided to exploit his discovery and intended opening negotiations in England. He was urged to keep the invention in Ireland and finally agreed to sell his patent rights to a company in Dublin. DuCros was a high-pressure promoter, and the ultimate result of his meeting with Dunlop was the formation in November, 1889, of the Pneumatic Tyre & Booth's Cycle Agency, Ltd.

The prospectus of the company listed as directors, in addition to Dunlop and DuCros, Richard W. Booth, of Booth Brothers, Frederick W. Woods, and Richard J. Mecredy, editor of the *Irish Cyclist*. It was stated that the company would take over Dunlop's British and Irish interests in patents for the improved tire, for a non-return air valve, and for an improved method of fastening hollow tires to wheels; as well as the cycle business of Booth Brothers and the Edlin cycle works. In return, Dunlop was to be paid £500 in cash and £3,000 in fully paid shares; Booth Brothers was to receive £4,000 in cash and £4,000 in shares, and the Edlin company £490 in shares. The remainder of the more than 22,000 £1 shares which were issued was offered to the public and soon subscribed.

The prospectus emphasized that the new tires' lack of noise, freedom from "vibration with the consequent nervous exhaustion," and "conservation of power through the machine going over rough surfaces unchecked, will . . . place the pneumatic tyred machine beyond the reach of competition. . . . The pneumatic tyre will be almost indispensable for ladies and persons with delicate nerves."

[1] With B. F. Goodrich Co., Akron, O.

*Taken from Dunlop company advertisement, *India Rubber J.*, Mar. 9, 1918.

Of particular interest is a paragraph which states that "Messrs. Haseltine Lake & Co. of 45 Southampton Buildings, London, the well known agents, have made extensive researches on behalf of the company to ascertain if the said patents and inventions have been anticipated, and they have reported satisfactorily as to same." Just how extensive good old Haseltine's researches had been would soon be demonstrated.

It would be a pleasant exception to the usual history of inventors to record that Dunlop reaped a rich harvest from his invention. The truth is that his reward was an insignificant one; it was only a few years until he was forced out of the company which now bears his name. Naturally the inventor bore the company no love. In 1920 he brought action to restrain it from issuing advertisements representing him "in absurd or unsuitable costumes" or in caricatures "calculated to expose him to public ridicule or contempt by misrepresenting his appearance." He objected to the company placing his features on "the body of a very tall man, dressed in an exaggeratedly foppish manner, wearing a tall, white hat, white waistcoat and carrying a cane and eyeglass, none of which it was his custom to carry." The defendants finally agreed to discontinue the publication of the pictures in Ireland.

The Welch Patent—1890

The company, Pneumatic Tyre & Booth's Cycle Agency, Ltd., was a great success from the start, although England's crack riders ridiculed the air tires and made fun of the Irish Brigade when it brought its machines shod with "bolsters" across the channel. When the Irish began taking all of the national championships, however, such a great demand arose for pneumatics that the company could not meet it. Fortunately for the corporation, in 1890, a few months after organization, it had purchased the new patent[2] of Charles Kingston Welch. Dunlop's tire was hard to remove and repair; his patent, although it was the original basis for the company, was never really subject matter for a valid patent as was later revealed. The tire the company really founded its business on was made under Welch's 1890 patent which covered the principle of attachment by two inextensible wires engaging a suitably grooved rim, much like our present-day beaded edge tires. In one of the 18 claims the Welch specification mentioned the applicability of the device to a pneumatic tire; this one claim eventually survived and became the basis of the Dunlop monopoly in England.

The rapidly increasing business of the Pneumatic Tyre company stimulated invention, and a minute search of patent office records was a natural result. The inevitable happened; the periodical *Sport and Play*, under the heading, "A Startling Discovery," was the first to announce the discovery of the Thomson patent of 1845. This was the company's first intimation that a patent already existed for the pneumatic and that, apparently, Dunlop's patent had been anticipated and was not valid. However it did not matter so very much as tires were being manufactured by this time under the Welch patent.

The furor created at this time reechoed not so many years ago when the city of Edinburgh decided to raise a statue in honor of the inventor of the pneumatic tire. After considerable uproar it was finally decided to recognize Dunlop. But Thomson is not without his memorial. At the time of the centenary of his birth the Royal Scottish Automobile Club erected a bronze plate at Stonehaven marking "The Birthplace of Robert William Thomson, the Inventor of the Pneumatic Tyre. Born 29th June, 1822. Died 8th March, 1873."

Formation of the Dunlop Company—1896

In 1896 the Pneumatic Tyre company was sold for £3,000,000, and it was then offered to the public for £5,000,000 as the Dunlop Pneumatic Tyre Co. Conspicuous among the directors of the new company were Harvey and Arthur DuCros by their presence and John Dunlop by his absence. Upon the formation of this company another important patent[3] was acquired—the 1890 invention by William E. Bartlett of the clincher tire. Autoists of an earlier day need no explanation of the clincher whose curved edge hooked under a curved rim and held the tire firmly when inflated. Bartlett at this time was managing director of the North British Rubber, and the Dunlop company paid his organization nearly a million dollars for the patent and permitted the retention of "manufacturing rights."

For a time the Dunlop company largely monopolized the pneumatic tire field in England, and even in the early years of its existence profits reached the $2,000,000 total although sales were almost exclusively of bicycle tires. A constant war had to be waged on infringers, the company being party to 162 suits in one year, and the expiration of the Dunlop-Welch patents in 1904 was viewed with more relief than regret.

America Becomes Interested in Pneumatics

The United States was at first loath to take up the air tire. In 1891 the racing board of the League of American Wheelmen was still fighting it, and racers who used "balloon" tires had to stand a heavy handicap. The deeds of Nancy Hanks in a "bike sulky" really taught Americans the virtues of the pneumatic. In 1892 "The famous Nancy, one time Queen of the Trot, that went against all comers and got away with the lot,"[4] trotted a mile in 2:04, clipping more than four seconds from the record set by William H. Vanderbilt's Maud S. in 1885—a record that was supposedly unbeatable. In her record-breaking performance, Nancy drew a pneumatic tired, bicycle wheeled sulky, and it was only a short time until steel tires disappeared from the Grand Circuit and solid tires from American bicycles. In fact the appearance of pneumatic tires and the advent of the Bloomer Girls[5] were practically simultaneous phenomena.

Oddly enough, after the pneumatic had been introduced to these shores, two of the outstanding improvements were developed almost at the same time on both sides of the Atlantic. A patent similar to Welch's for wired edge tires was granted to A. T. Brown and G. F. Stillman,[6] of Buffalo. The fact that the invention was original with the Americans was admitted by the Dunlop company in its payment of $100,000 for the patent. The Bartlett clincher patent[3] was paralleled in this country by a similar device patented[7] by Thomas B. Jeffery. This tire was put on the market by the Gormully and Jeffery Mfg. Co., maker of the Rambler bicycle, and soon became known as the G. and J. When its manufacture was carried to England, the holders of the Bartlett patent soon stopped it with an infringement suit, and similarly when the North British Rubber Co. tried to market clincher tires in America, it was successfully sued by the G. and J. company.

---

[2] British patent No. 14,563, issued Sept. 16, 1890.
[3] British patent No. 16,783, issued Oct. 21, 1890.
[4] Quotation from the poem "In Memory of Nancy Hanks," by Will J. Lampton.
[5] A term applied to feminine cyclists in the '90s because they wore "bloomers," a costume designed by Mrs. Amelia Bloomer, of New York.
[6] U. S. patent No. 488,494, issued Dec. 20, 1892.
[7] U. S. patent Nos. 434,115, 466,565, and 466,789, issued in 1891 and 1892.

The First Cord Tire—1893

Another great tire idea had its inception in the United States, went to England, and then recrossed the Atlantic. In Dunlop's pneumatics and other early tires, square woven fabric had been used. In this type of material there are an equal number of threads running at right angles to each other, one set called the warp and the other the weft. These strands chafe each other constantly, causing separations and blow-outs, and they eliminate the stretch which permits necessary flexing. At the Philadelphia Cycle Show in February, 1893, the first "cord" tire was shown. The fabric in this tire was all warp; there was no weft. The inventor was John Fullerton Palmer, born on an Illinois farm in 1860, and successively marble cutter, American Express clerk, furniture salesman, designer of church seats, and, in 1891, bicycle salesman. In 1893, Palmer patented his tire both in this country and in England. English riders found the tires so much faster that race officials handicapped everyone who used them.

Manufacture of the revolutionary casing was undertaken in England by the India Rubber, Gutta Percha & Telegraph Works at Silvertown. In 1903, Christian Gray and Thomas Sloper, of this company, adapted the cord principle to automobile tire use. In 1910 the Diamond company of Akron acquired the American rights to the Gray-Sloper Silvertown Cord. The rights, together with the Diamond company, passed to Goodrich of Akron two years later. Incidentally this is the source of the word "Silvertown" which is still featured in the latter company's advertising. In this fashion the cord idea, which originated in America, traveled to England as a bicycle tire, returned to its native land a full-grown auto tire.

The First Pneumatics for Autos

It was, of course, the development of the automobile, beginning in the first years of the current century, which caused the tire industry to grow to its present enormous size. The first pneumatic automobile tires[8] turned out in the United States were made by the Hartford Rubber Works, Hartford, Conn., for Charles E. Duryea, of Springfield, Mass., pioneer builder of horseless carriages. In 1894 the Hartford company, which later became a part of the United States Rubber Co., made a set of single tube pneumatics which were two inches in cross-section, 44 inches in diameter for the front wheels, and 48 inches in diameter for the rear. These were installed on Duryea's third car in March, 1895. His two previous machines had been equipped with solid rubber tires.

Duryea's pneumatic equipped car won the first motor vehicle contest ever held in America, the *Chicago Times-Herald* race from Chicago to Evanston and return on Thanksgiving Day, 1895. A blizzard covered the course with 12 inches of snow, and only six of the sixty original entrants were able to start. Duryea made the 50-mile trip in 7½ hours and collected a $2,000 prize. Only one other car finished the race.

Alexander Winton, of Cleveland, another pioneer automobile manufacturer, tells an interesting story of the difficulty he had in getting pneumatics in 1896:[9]

"I went to the Goodrich company in Akron, and told them I wanted something bigger than their biggest bicycle tire, something that would fit the wheels of a horseless carriage.

" 'That's a new one on us,' cried a man to whom I had been directed. 'A horseless carriage, eh? Humph! Will it run?'

" 'You bet it will.'

" 'Well, I guess we can make them, although we never have.'

" 'That's fine.'

"The man hesitated, rubbed his chin and observed: 'We will make them, but you will have to pay for the molds.'

" 'Do what?"

" 'Yes, sir. There won't be enough call for tires for horseless carriages and we can't afford to pay for the molds. Also, you will have to pay for them in advance—and the tires, too. We'll have them on our hands if you don't get them.'

"I paid.

"They were single tube affairs and pretty expensive.

[8] Taken from INDIA RUBBER WORLD, May, 1937, p. 71.
[9] "Get a Horse," Alexander Winton, *Saturday Evening Post*, Feb. 8, 1930.
†Taken from "The History of the Pneumatic Tyre," by J. B. Dunlop. Dublin, 1924.

Charles Duryea in the Automobile Equipped with the First Pneumatic Auto Tires Made in the United States

Dunlop in 1918 Riding a Bicycle Equipped with "Bandaged on" Type of Tires Made (Front) in 1889 and (Rear) 1892†

It wasn't long before I got a puncture, and while I thought of patching the tire I figured out what I considered a better idea. Molasses was heavy and would stop leaks if they weren't too large, so I began pumping it into the tube. I pumped too hard. The rubber gave way and the molasses came out too quickly to be dodged."

Development of the Automobile Tire

In France, in 1895, the brothers Michelin, Edouard and Andre, found that they were wasting their collective breaths in trying to convince the manufacturers of whatever motor cars France had at the time of the importance of pneumatic tires. As a result, they built their own motor car, equipped it with pneumatics and entered it in the Paris-Bordeaux race. The car finished the trip at a cost of 22 inner tubes. Development of the automobile in England was somewhat behind the United States and France, largely because of the restrictions imposed by the Locomotive Act of 1865, which stated that self-propelling vehicles might not exceed a speed of four miles per hour, and required every such vehicle to be preceded at a distance of twenty yards by a man carrying a red flag. In the early '90s a great deal of interest was shown in the devising of carriages to be propelled by steam, gas, electricity, gasoline, or compressed air, and some of the experimental machines were able to attain speeds of eight to ten miles per hour. Expectations were that even these speeds would be exceeded, and as those who drove such vehicles were already constantly breaking the law, a demand arose for the repeal of the old statute. The agitation had the desired effect in 1896, and the abolition of the four-mile speed limit gave a great impulse to the development of motor cars. Another English statute that appears amusing today was the 1893 regulation requiring that cabs fitted with "noiseless India rubber tires" must carry bells either on the vehicle or the harness.

In each of the three countries, first auto tires were modifications of the prevailing type of bicycle tire; in the United States they were single-tube affairs; in France, the clincher, double-tube type; and in England, the wired-on double tube. By 1905, however, all had come around to the clincher double-tube tire. As American cars became bigger and heavier, larger tires were required, and larger clincher tires were not satisfactory because they were hard to remove from the rim. By 1907 manufacturers in this country were turning back to straight-sided wire beaded tires and equipping wheels with split or detachable rims. During the war Europe looked to America for a goodly share of its tires, and the American straight-side tire began to gain in popularity. With the coming of the low-pressure or "balloon" tire in 1923 the clincher tire passed out of the European picture altogether.

Legal Troubles in the Tire Industry

Throughout its short life, especially during its younger days, the tire industry has been considerable of a court hanger-on. In the United States the Tillinghast single-tube tire patent was the basis of one of the longest and most vigorously contested suits. The patent for the single tube tire was granted Pardon W. Tillinghast, May 23, 1893. In 1895 Tillinghast notified the Pope Mfg. Co., owner of the Hartford Rubber Works, that it would be prosecuted if it made hose pipe tires without paying royalty. Col. Albert A. Pope, president of the company, purchased the patent, placed the tires on his Columbia bicycles, earned them such popularity that they are still the standard cycle tire in this country today. Colonel Pope, originally in the shoe manufacturers' supply business in Boston, had seen a high-wheeled bicycle of English make at the Philadelphia Centennial in 1876. Interested, he learned to ride, and then took on importation of the machine. In 1877 he had a cycle built at a cost of $313, the first made in America. The Pope Mfg. Co. arranged to have its bicycles manufactured by a sewing machine company in Hartford, finally took over control, bought up many patents, and was instrumental in organizing the American Bicycle Co. in 1899.

The Hartford company began to prepare suits against several of the leading infringers, who immediately saw the light, took out licenses, and ganged together to form the Tillinghast Tire Association. Not all of the important companies took out licenses; a number of suits were brought, and two carried through to victorious conclusion—against the Reading Rubber Tire Co. of Massachusetts, and against United States Rubber Co.'s New Brunswick company. Following the favorable decisions in 1899, the Single Tube Automobile & Bicycle Tire Co. was incorporated for $1,000,000 in New Jersey, and the Tillinghast association ceased to exist. At the same time Colonel Pope announced the sale of his interest to the Rubber Goods Mfg. Co., newly expanded sister corporation of U. S. Rubber and one that in a few years would be absorbed by it. A six-year court fight with the Continental Rubber Works resulted in a Single Tube victory in 1910. Damages involved a considerable sum as Continental had made over a million tires in infringement, and the patent holders demanded 5% royalty with a 15¢ per pair minimum.

A monopoly which did not fare so luckily when called upon to defend itself in the courts was that controlled by the G. & J. Clincher Tire Association. As mentioned earlier, the clincher tire idea was patented in the United States by Thomas J. Jeffery and the patent assigned to the Gormully & Jeffery Mfg. Co., bicycle maker. This company came under the control of the American Bicycle Co., which disposed of its tire making interests to the Indianapolis Rubber Co. When the latter organization, as the Hartford had, became a part of the Rubber Goods Mfg. Co. in 1899, the G. & J. Tire Co. was formed as a subsidiary to control the Jeffery patents. In the early years of the century, the Association—a pool of licensed manufacturers—was formed under the management of a lawyer commissioner. Agreements were reached as to the volume of production, percentage allotted to each member, and prices. Members were United States Rubber, Fisk, Michelin, and three Akron companies, Goodrich, Diamond, and Goodyear.

The scheme was similar to the Selden monopoly which existed at the same time and under which all of the auto manufacturers, except Henry Ford, were working. Competitors unable to obtain licenses went right ahead and manufactured anyhow and against a really important one —Pennsylvania Rubber Co.—the Association took action. In September, 1907, the court dismissed this suit because even the complainant had departed from the original form of fastening specified in the patent.

Perhaps the most interesting of all tire industry suits was that involving Louis H. Perlman's attempt to monopolize the demountable steel rim. No tire manufacturer of the early years could sell casings to auto makers without rims to put them on, and so it was that this business had become a rubber industry offshoot. For a while near-monopoly was exercised by the United Rim Co., holding company in which leading tire producers pooled their patents. It charged a royalty of $2 a set, and the Standard Welding Co. did its actual manufacturing. At the time of the Perlman action this combination was past history, but Standard still made most of the rims for the

country. Perlman had filed an application for a patent, claiming to be the original inventor of the demountable rim, and in 1913 was granted one which covered every form then in use. He immediately sued Standard. The suit was not taken seriously as there was no record of Perlman having tried to sell his invention in the beginning, and it seemed odd that a patent covering a whole industry should suddenly come to light after the industry had been in full operation for six or seven years. Two years later Perlman won his suit.

In 1916 the complacent rim trade, expecting the suit to be dismissed on appeal, was again fooled when the decision was affirmed. The Standard Welding Co. paid $1,010,000 to the Perlman Rim Corp. in an accounting of profits and was forced to close its factory. All rim manufacturers were given notice to discontinue operations. The auto industry was disturbed as its output was seriously threatened. Manufacturers who had been receiving rims from Standard made arrangements with the Perlman Corp. to release enough rims to maintain their deliveries; several other rim manufacturers submitted and turned their plants over to the Perlman outfit. Harvey S. Firestone, of Akron, who as small fry outside the original pool had been forced into making his own rims, kept right on going. Teamed with the National Automobile Chamber of Commerce, he set W. J. Burns to delving into the Perlman past while awaiting the inevitable suit. According to Firestone, Burns "found the original rim which Perlman swore he made in 1906, and scraping off the paint, discovered the stamp of the old rim association which Perlman had not taken the trouble to file out! The 'original' rim had been made in 1912 and not in 1906. Then we knew we were on the trail of a fraud."[10]

In England, Perlman had a jail record, it developed, and actually was a fugitive from justice in connection with a patent medicine fraud. Meanwhile the expected suit had been filed and came to trial before Judge Learned Hand in United States District Court in New York in 1917. Perlman made a good witness on both direct and cross-examination until, with adjournment time nearing, the Firestone strategists exploded their bomb. The flustered Perlman had only "I can't remember" to answer as the English record was raked over. His counsel attempted to withdraw, court was adjourned, and the case never did go on.

One of the last big suits was that involving the Putnam balloon tire patent. Alden L. Putnam filed application for a patent on the balloon tire August 13, 1920, and was granted a patent[11] May 12, 1925. Manufacturers, notified of their infringement, took the stand that the balloon was only a logical development of the pneumatic tire idea. During the course of the ensuing court fight it was shown that balloon tires had been used by the King of England as early as 1910. The Putnam patent was finally declared invalid by the District Court of Michigan and by the United States Circuit Court of Appeals.

Such are a few of the more interesting samples from the history of tire litigation—a history as old as the industry and one that will continue to be written as long as the industry endures.

[10] Taken from "Men and Rubber," by Harvey S. Firestone and Samuel Crowther.
[11] U. S. patent No. 1,537,879.

Patent Decision

(*Continued from page* 36)

ficial coating that would afford flexibility and that it could be made thin enough to make a good bond.

The difficulty is in compounding the right mixture for a given fabric. It is a purely practical and not a theoretical difficulty which must be solved by the ordinary skill of the artisan exercised through trial and error. In other words, to avoid bulk and stiffness, and to obtain a light flexible article, he will concentrate such a compound for coating as will afford a satisfactory bond. We agree with the court below that the Hopkinson patent is invalid for lack of invention.

Foster and Cook Patent No. 1,816,574

This patent follows Hopkinson and adds nothing to his process beyond applying it to a fabric in which strands instead of being woven into the base are loosely needled in. While it is true that the purpose of the Hopkinson process was to waterproof the fabric and that of Foster and Cook to anchor the piles to the base, the latter process was merely a new use of Hopkinson's process and the application of it to anchoring piles required no inventive thought. Moreover U. S. patent No. 2,007,078 to Crabtree discloses a process for anchoring "the pile into the ground or back of the cloth by means of a cementitious or viscous coating, for example, a cellulous compound such as pyroxylin."

The fact that Crabtree suggested "pyroxylin" is unimportant, even if another compound would have been better, for later he said that the coating might also be a "rubber composition" which would include the prior compound of Gibbons or Hopkinson. Nor is it important that in his original application he spoke of stiffening his material so that it would be unnecessary to use cardboard for automobile linings since he spoke elsewhere in that application of applying "a thin layer of the coating." But even if Crabtree only intended to anchor the piles by a stiff layer of rubber instead of one that was flexible, it certainly was no invention to use the compound and method of anchorage of Hopkinson in place of the stiffer anchorage of Crabtree for coating the pile fabric of the Crabtree patent.

The decree is affirmed.

Tire Stocks

(*Continued from page* 34)

TOTAL REPORTED STOCKS

	April 1	July 1
Number of firms	13	13
Number of stores	3,895	3,974
Casings	2,051,320	2,156,388
Inner tubes	1,727,609	1,781,612

Through cooperation of the Greater New York Tire & Battery Association, its members were circularized in the current survey. Returns received from New York City, Brooklyn, and Long Island numbered 64 covering 74 stores, and aggregate stocks reported were 75,632 casings and 216,871 inner tubes, 33 firms reporting less than 200 casings each, and 12 firms from 200 to 499 casings, while 19 other firms (over 500 casings each) accounted for 68,614 casings. The total stocks reported by 271 dealers for 354 stores in the State of New York amounted to 152,705 casings and 326,193 inner tubes, the city area accounting for about half the total casings and two-thirds of the inner tubes. In our next survey it is expected comparative data will become available.

The support of The Rubber Manufacturers' Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the cooperation and promptness of dealers, oil-company distributers, manufacturers, and other mass distributers, in submitting data used in this report, is gratefully acknowledged.

Physics of Rubber as Related to the Automobile—II[1]

W. F. Busse[2]

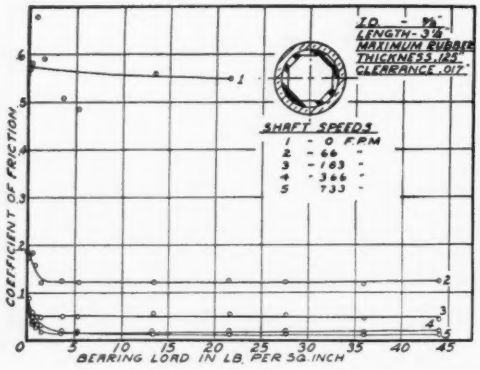


Fig. 1. Effect of Load on Coefficient of Friction of a Fluted Rubber Bearing

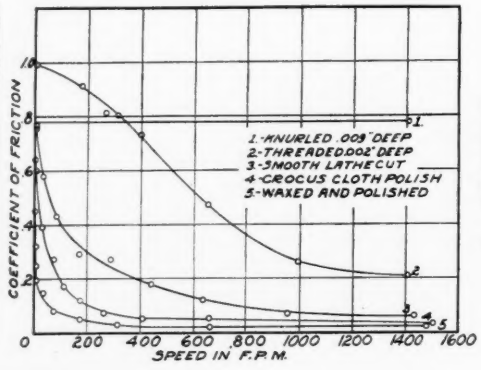


Fig. 2. Effect of Speed and Roughness of Metal Surface on the Coefficient of Friction against Wet Rubber

NEARLY every problem in the product development field requires the closest cooperation of the engineer, chemist, and physicist, and ultimately also the help of the production man and salesman, and usually it is impossible to evaluate the separate contributions of each group. This discussion will be limited to a few of the developments with which physicists have been concerned.

Tires

The tires of an automobile have a number of functions: they furnish an air cushion under the car to take up road shocks; they transmit the driving and braking forces to the road; resist abrasion; and they make steering possible at the modern high speeds.

Tube Inclusion of Gases

To fulfill the first of these functions, the tires must have an inner tube that will remain intact mechanically over long periods of service, and also will prevent as much as possible of the air from diffusing through the rubber. The so-called puncture-proof tubes on the market use various means of keeping the tube intact, but there is not time to discuss them here. A number of methods of reducing the diffusion of air through the inner tubes are available, but they all increase the cost of the tubes, and with free air at every gas station, the public will not pay the necessary premium for a low permeability inner tube. The relative diffusion rates of different gases through rubber varies enormously, as shown in Table 1.

Fig. 3. Test Truck Used to Measure Friction of Tires on Wet Roads

TABLE 1

Gas	Relative Rate of Diffusion	Gas	Relative Rate of Diffusion
Nitrogen ..	0.16	Carbon dioxide.	2.9
Air	.22	Ammonia	8.0
Oxygen ...	.45	Methane	13.9
Helium	.65	Water vapor...	50.0
Hydrogen..	1.0	Ethyl chloride.	200.0

Because of the difference in diffusion rates, air that remains in a tire for a year or so has considerably less oxygen and more nitrogen than normal air. The temperature coefficient of diffusion is surprisingly high, as shown in Table 2. This explains why it is necessary to pump up tires so much more frequently in summer than in winter.

TABLE 2. CHANGE IN PERMEABILITY WITH TEMPERATURE FOR INNER TUBE 0.054-INCH THICK INFLATED TO 28 LBS./IN.[2]

Temperature °C.	Temperature °F.	Volume of Air Diffusing Out in Cu. In. at NTP per 24-Hr. Per Sq. Ft.	From a 6.00-16 Tube	% of Total Air Diffusing Per Day
0	32	1.4	13	0.3
30	86	9.8	88	2.0
60	140	24.5	220	5.6

Casing Stresses

The casing of the tire must withstand not only the stress due to the compressed air in the inner tube, but also all the driving stresses produced by the motor, and the stopping stresses produced by the brakes. Rubber has too high an elongation to do this satisfactorily alone; so it is reenforced by cotton cords and metal beads. Most of the tire development work to determine the proper angle of the cords, the kind and size of breaker strips, the methods of tieing in the beads, and so on, has been on a cut-and-try basis. The tires were tested by running them on the road, or by running them on a Sprague

[1] Abstracted from *J. Applied Physics*, July, 1938, pp. 438-51. Paper presented at the Symposium on Physics in the Automotive Industry at Ann Arbor, Mich., Mar. 14 and 15, 1938.

[2] Physical research laboratory, B. F. Goodrich Co., Akron, O.

dynamometer against a wheel having cleats on its surface. This type of development is costly, but it is the only type that can be used when there are so many unknown variables in the problem.

Attempts have been made to calculate the stresses in a casing, but with only very limited success. The stresses in a thin-walled torus due to an internal pressure may be calculated, but when the torus is deflected by an external load, as is the case when a car rests on the tire, the problem becomes more complicated. If, in addition, driving and braking stresses, and the effects of the finite wall thickness and the heterogeneous structure are considered, mathematical analysis of the problem is almost hopeless. But this does not mean that the mathematical attack is useless. for the solution of even the much idealized problem of the thin-walled torus furnishes a guide for designing tires of different sizes after the design of one size has been worked out empirically. This problem remains a challenge to our best mathematical talents.

Fig. 4. Some of Tire Designs Cut from Smooth Treads

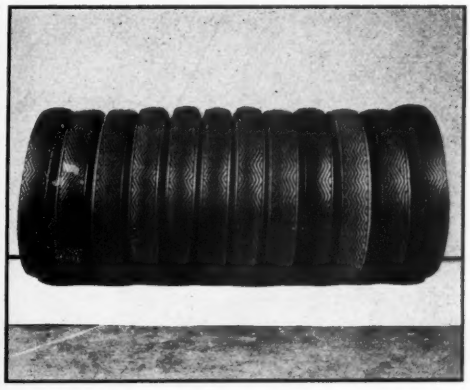


Fig. 5. Experimental Molded Tires Used in Tread Friction Study

Influence of Tread Design on Friction Coefficient

Sometimes fundamental principles which are found in studying one product have a direct application in the development of entirely different products. Some years ago a study was made of the lubrication of rubber bearings with water. The laws governing this system turned out to be quite different from those of metal bearings lubricated with oil, since the coefficient of friction is almost independent of load (Figure 1). The coefficient of friction decreases with increasing speed (Figure 2), the rate of decrease depending very much on the smoothness of the shaft surface.

This work helped improve the design of rubber bearings, but it apparently had little relation to the design of tires. However, when a tire skids on a smooth, wet pavement, it acts much like a cutless rubber bearing; so the principles that were used to make a rubber bearing with a low coefficient of friction could be used in reverse, as it were, to design a tread with a high coefficient of friction, or high skid resistance, on wet pavements.

The detailed development of these high friction tread designs required an enormous amount of work by tire engineers, as the designs had to be checked by measuring the coefficient of friction of full sized tires on the road. Equipment such as shown in Figure 3 was used. The tire to be tested was put on one wheel of a trailer which was in line with the drawbar, which was attached, in turn, to a dynamometer on the truck. An observer on the truck operated an hydraulic brake on this wheel, and the force on the drawbar was automatically recorded. Tanks of water on the truck eliminated dependence on the weatherman for wet roads.

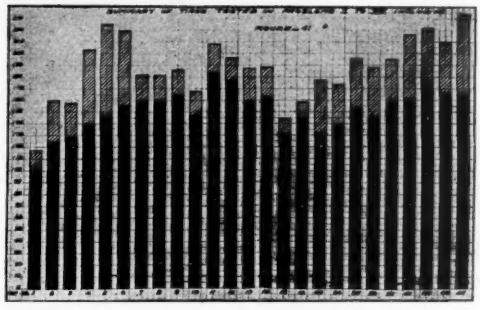


Fig. 6. Range of Friction Coefficients (Ordinates) with Different Tread Designs; Tire No. 1 at Left Has Smooth Tread

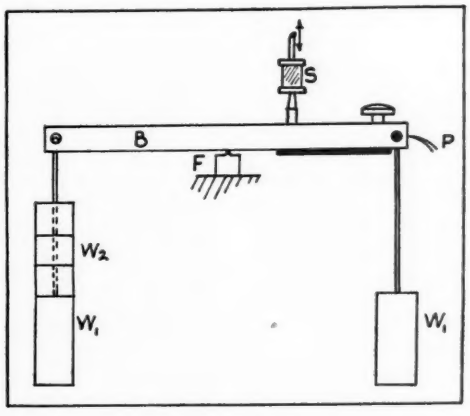


Fig. 7. Diagram of Goodrich Flexometer for Measuring Hysteresis of Rubber Samples

Some of the tread designs that had to be tested are shown in Figures 4 and 5. The first group was made by cutting the designs in smooth tires; while each tire of the second group had to be made in a special experimental mold.

The curves in Figure 2 show that in a rubber bearing the static friction is very high and that it drops as the speed increases. The rolling tire is somewhat analogous to the static rubber bearing; while the skidding tire resembles the rubber bearing with the shaft in motion. One would then expect the coefficient of friction to be greater when the tire was just coming to a stop than it would be after it started skidding, and this was found true in tests. Figure 6 shows some of the results that were obtained when various tread designs were tested on a given wet road. The tops of the cross-hatched sections show the relative magnitudes of the maximum coefficients of friction obtained just before the wheels locked, or the impending skid resistance. The solid blocks show the relative frictions of the tires after skidding starts, or the full skid resistance. The block at the left, for the smooth tire, is taken as standard. It is seen that some designs give nearly twice the co-

efficient of friction or skid resistance of the smooth tire on wet roads.

Hysteresis Determination

The generation of heat in rubber by flexing caused a great deal of trouble in the old solid tires, and recently, due to higher operating speeds, it has become important both in fan belts and pneumatic tires. To measure the relative hysteresis of compounds more accurately than had been possible before, Dr. Lessig developed the Goodrich flexometer shown diagrammatically in Figure 7. The cylindrical sample at S rests on a lever system B, whose moment of inertia is increased by the two weights W_1. The weight W_2 puts the sample under a definite compression load while a high frequency vibration is impressed on the sample through the upper anvil. The temperature rise at the base of the sample is measured by a fine wire thermocouple and potentiometer. Figure 8 is a picture of the flexometer equipped with an oven for measuring the relative hysteresis of compounds at high temperatures.

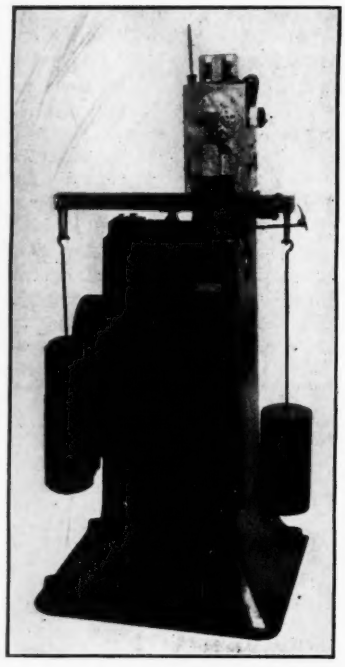


Fig. 8. Goodrich Flexometer Showing Oven Used in Testing Samples at High Temperatures

Cushion Mountings

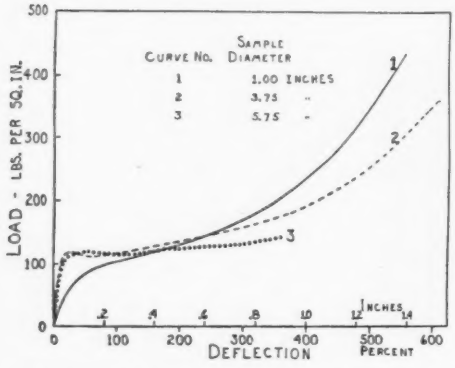


Fig. 9. Stress-Strain Curves of ¼-Inch Thick Rubber Disks Cured to Metal Plates

The use of rubber mountings to isolate the motor vibration in automobiles has led to a number of interesting problems and developments. One of the first problems was to obtain compounds that had low permanent set. Chemists have greatly improved the compounds in this respect during the last few years.

Another important problem is to determine the shape of the rubber and metal parts to get the best combination of physical properties. Because of the high elongation of rubber and the low elongation of metal, purely geometric factors such as sample size and shape may produce some very curious effects. If a disk of rubber, say ¼-inch thick, is cured between two disks of metal, a sandwich-type mounting is formed. Shear strains of several hundred per cent. may then be applied to the rubber without injuring it. If, however, a direct tensile pull is applied to the rubber, some rather unexpected results are obtained.

Deformation under Stress

Figure 9 shows stress-strain tests for three mountings of this disk type which are one inch, 3.75 and 5.75 inches in diameter, respectively, each having a ¼-inch layer of vulcanized rubber adhered to rigid metal disks. The first 25% elongation produces a marked increase in the load, but in the larger samples, at least, further increases in the elongation, up to several hundred per cent., produce little or no increase in the load. Then, if the samples do not break, they stiffen up on further elongation. It should be noted that the one-inch diameter sample shows this behavior to a much smaller degree.

Fig. 10. Internal Failures of Disk Samples Tested in Tension Showing Cracks in Rubber

These results are due to the fact that rubber is highly deformable, but it undergoes only slight change in volume when stretched or compressed—that is, its Poisson's ratio is close to 0.5. When this disk sample is pulled, the rubber must "neck down" and pull in at the edge to keep its volume constant, since the area against the plates is fixed. A simple computation shows that the rubber at the edge is stretched to its ultimate elongation before the rubber at the center can be stretched

(A) (B)

Fig. 11. Internal Failure of Disk Samples Tested in Tension Showing Porosity (A) and Conical Cracks (B)

very far. This produces large lateral tensile stresses on the rubber at the center, and these stresses produce cracks within the sample which may travel almost parallel to the initial tensile stress instead of at right angles to it, as one might expect. The cracks tend to relieve the lateral stresses and allow the sample to be stretched farther by the applied stress. The elongation may ultimately reach 400 or 500% before the samples fail by tearing normal to the direction of the applied tension. The pictures of the torn surfaces in Figures 10 and 11 show some of the different kind of cracks that may occur.

These tests throw considerable light on the different mechanical structures present in these compounds, and they also have a bearing on specification tests of rubber mountings. Tensile tests of rubber mountings are justified as a check to make sure that the adhesion of the metal is above a certain minimum value, but it should not be assumed that a mounting that fails in a tensile test at 1,200 pounds is 20% better than one which fails at 1,000 pounds, or that a mounting that has a dull, porous fracture is better than one with a shiny, conchoidal fracture. Compounders occasionally have had to sacrifice something in important properties such as creep in order to meet specifications for tensile strength, type of fracture, or other properties which are not related to the behavior of rubber mountings in service. If a high tensile pull should really be needed in any service, it might be better to get it by changing the geometry of the mounting rather than by changing to a compound which exhibits a particular kind of fracture, and perhaps also has a higher creep.

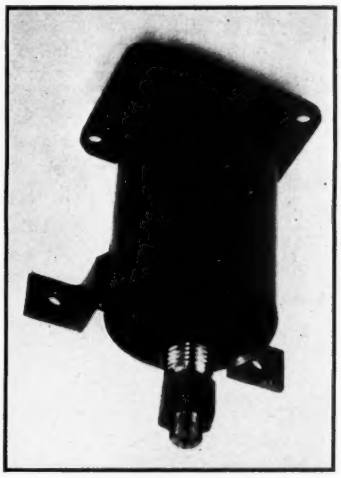


Fig. 12. Rubber Spring Used on Mills and Plasticator

Vibration Absorption

The success of rubber motor mountings in isolating motor vibrations undoubtedly has stimulated the use of rubber mountings to isolate the vibration of heavy industrial machinery and street cars. In this field shear-type mountings are used almost exclusively; one model is shown in Figure 12. The mills and plasticator shown in Figures 13 and 14 are supported by this type of mounting. The mill and motor weigh about 45 tons, and the plasticator weighs 80 tons, all of this weight being supported by rubber in shear. The effectiveness of rubber mountings on these machines is shown in Figure 15, the curve marked station 1-3 showing the building vibration produced by the plasticator when it was on a rigid mounting, and the curve station 2–3 showing the vibration at the same place when the plasticator was supported on these shear-type rubber mountings.

The success of these large industrial and street-car mountings indicates that it is practical to replace the steel springs of automobiles with rubber. It has been pointed out that if used in tension, a rubber spring will store about seven times as much energy per unit volume, or about fifty times as much energy per unit weight as will steel. If the steel is put in the form of helical springs, and the rubber is used in shear as in street-car springs, the comparison at 4,000-pound load becomes, according to Hershfeld and Piron,

	Rubber Spring	Steel Spring
Energy absorbed per cubic inch of space.....	16.5 in. lb.	27 in. lb.
Energy absorbed per cubic pound of material.....	374.0 in. lb.	237 in. lb.

Mechanical Design

The problem of replacing steel springs and rubber in the automobile involves developing a mechanical construction which will magnify the distortions of the rubber so that it will carry high loads and yet have a very soft load-deflection curve. Among the various methods of accomplishing this, pneumatic devices having air under pressure held in flexible rubberized fabric bags have been suggested. A very simple method now being tried is to use rubber springs in torsion. These torsion springs can be "wound up" to support high loads, and yet have a soft load deflection curve. The small amount of creep or elastic after-effect that may develop after a few years' service can easily be compensated by various means, such as by a slight increase in the initial twist given the bushings. This development may lead to a new market for rubber products and to simplified designs and improved riding qualities of the automobile.

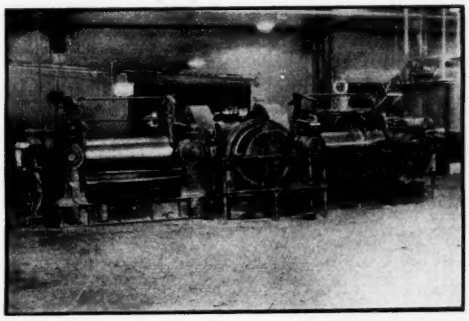


Fig. 13. Double 20- by 60-Inch Mill Unit Mounted on Rubber Springs

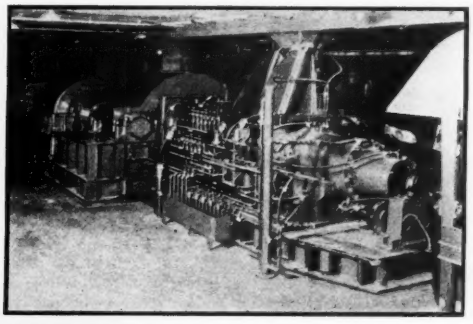


Fig. 14. Twenty-Inch Two-Stage Plasticator Unit Mounted on Rubber Springs

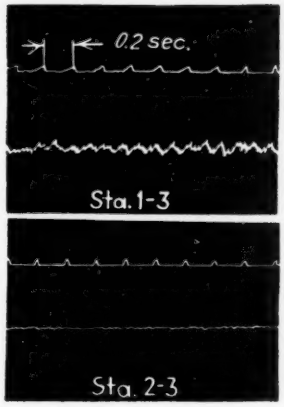


Fig. 15. Vibrograph Record Showing Building Vibration near Plasticator When Rigidly Mounted (Sta. 1-3) and When Mounted on Rubber (Sta. 2-3)

SCIENTISTS RECENTLY DISCOVERED THAT NITROGEN AT high temperatures combines as a vapor with many chemicals. Amines, used as rubber accelerators, can be made at a reduced cost from natural gas by this process.

Editorials

Export of Rubber Goods

RELATING to the future possibilities for exporting rubber goods, it is significant to note that along with the decline in exports there has been an active trend toward the establishing of new rubber goods producing companies in other countries. Although in 1937 88% of the crude rubber absorption was concentrated in eight countries, there were 53 countries participating in the manufacture of rubber products as compared with 19 countries in 1900. This movement may be attributed primarily to three causes: the desired self-sufficiency of countries, restrictions because of the rate of exchange, and differential in labor cost.

In the foreign field considerable expansion is developing from the governmental tendency to grant partial or complete monopoly to locally established plants which in some instances are permitted to expand into other branches of the industry although new companies cannot be established. In many cases these plants are financed and staffed from outside the country. Labor costs in some foreign countries are as low as one-fifth of that for similar products in this country, and as labor constitutes in the neighborhood of 50% of the American production cost, this differential becomes a vital factor in competitive selling.

The present reduced volume of rubber goods exports is confined largely to tires, repair materials, and mechanical goods, thus indicating a growing diversification in the manufacture of rubber products in other countries. In 1920 United States exports of rubber manufactures reached $85,000,000 and in 1932 dropped to approximately $16,000,000, after which they rose to $32,000,000 in 1937 and in 1938 have shown an annual rate of approximately $27,000,000.

In view of the drastic reduction in United States export volume and the trend now evident in foreign countries there appears a sound basis for believing that the former position will not again be attained. If the tendency to world decentralization is to be arrested, the only apparent means lies in the possibility of lower unit labor costs in the former exporting countries, at least to a narrow differential where superior quality may bridge the gap.

Much emphasis is being placed upon the effect of trade treaties as a stimulant to exportation from the United States. However fundamental conditions such as now exist in connection with rubber products cannot be overcome by international agreements, but the vital factor of cost differential must be eliminated if American goods are to find a sizable place in foreign markets.

A number of American rubber companies have or are establishing factories abroad and because of their competitive labor cost should be able to get their proportion of the business. However employment in this country is suffering by the manufacture of rubber products abroad rather than at home. It is high time that American labor should realize that unit labor costs cannot continue to increase through restricted man-hour production coincidental with higher hourly wages if it is to benefit from this potential outlet for American made goods.

Increased Government Personnel

THE constantly increasing governmental expense is exemplified by employment statistics recently released by the statistical division of the National Industrial Conference Board. Exclusive of emergency workers of the WPA and the CCC who are not considered in these totals, 79,000 employes have been added to the regular federal, state, and local government payrolls since September, 1937, and 520,000 since 1929. Of this increase 454,000 have been added since 1934.

The total employment in the United States has decreased from 47,885,000 in 1929 to 40,901,000 in 1934 and to 42,955,000 as of June, 1938. The ratio of government to total employment has increased from 4.3% in 1929 to 5.2% in 1934 and to 6% in June, 1938.

Assuming that total employment represents the productive part of the population and indirectly business activity, it would appear that to be on a sound basis personnel expense of government should be closely proportionate to the total employes who in the final analysis must pay the bill. In 1934 approximately one man out of every 20 was employed by the government and in June, 1938, one-sixteenth of the employed persons were on regular governmental payrolls. As the employment of state and local government workers is more closely parallel to trends of general employment, the major portion of the governmental employment increase has been federal. The rapid extension of federal authority in agriculture, manufacturing, and other fields of industry is reflected in the figures for the past five years.

These figures may well be pondered as an indication of the fast growth of a federal organization which has great possibilities of becoming a permanent burden on the taxpayers of this country.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Activities

Candid Snapshots of Boston Outing Taken by G. W. Smith

A. The Horse Racing Game; B. (Standing): Silver (N. J. Zinc), Harragan (N. J. Zinc), Noble (Consultant), Thompson (Anaconda), Gurman (Consultant); C. Lukens (Thompson Weinman), Mullen (Whittemore), Royce (Boston Woven Hose), Miller (Barrett); D. Haslam (N. J. Zinc); E. Krismann (Du Pont), Smith (Barrett); F. Cowdery (Barrett); G. Osberg (INDIA RUBBER WORLD); H. Fuller (Pequanoc); I. Brock (Cabot), Walton (Boston Woven Hose)

Boston Group Outing

APPROXIMATELY 150 members and guests enjoyed a day of sports and fun at the second annual outing of the Boston Group, Rubber Division, A.C.S., held at the Weston Country Club, Weston, Mass., on August 19. The affair, aided by perfect weather and a beautiful location, was ably directed by James C. Walton, outing chairman, and owing to efforts of the committee, was an outstanding success. Jim Walton was assisted by G. W. Smith, A. R. Lukens, E. H. Krismann, R. J. Noble, and Gladding Price.

The golf tournament was the feature of the day; non-golfers took part in other activities such as tennis, horse racing, and dart throwing. Winners in the golf tournament follow: low gross, E. M. Rupert, G. E. Wilson, and C. K. Mullen; low net, E. Colligen, A. T. Puschin, and Mr. Walton; second low net, F. Russell, J. O'Connel, and E. J. Mayo; kicker, J. McCarthy, F. E. Rupert, and W. H. Peterson; most fives, G. Linberg; most sixes, J. R. Fisher; most sevens, A. Ross; most eights, R. Patrick; highest on one hole, W. H. Smith; high gross, T. M. Knowlton.

During the afternoon refreshments were served on the club house veranda, a cool retreat for those participating in the sporting events. At seven o'clock an excellent dinner of chicken, steak, or lobster was served in the club house, after which prizes were distributed to golf winners and to a large number of lucky ticket holders.

The prizes were made possible through the generous donations of the following concerns: Aluminum Flake Co., American Cyanamid & Chemical Corp., American Zinc Sales Co., Ansbacher-Siegle Corp., Archer Rubber Co., B. B. Chemical Co., The Barrett Co., Binney & Smith Co., Bolta Rubber Co., Inc., Boston Woven Hose & Rubber Co., Godfrey L. Cabot, Inc., Callaway Mills, Cambridge Rubber Co., Carter Bell Mfg. Co., The Chemical Pigment Co., Continental Carbon Co., Colonial Beacon Oil Co., Inc., Davidson Rubber Co., E. I. du Pont de Nemours & Co., Inc., Wm. D. Egleston Co., W. F. Gammeter Co., General Atlas Carbon Co., Haartz-Mason-Grower Co., C. P. Hall Co., Halowax Corp., Hird & Connor, Inc., Hodgman Rubber Co., Howe & French, Inc., Imperial Paper & Color Corp., INDIA RUBBER WORLD, Irvington Varnish & Insulator Co., Ernest Jacoby & Co., Jute Industries, Ltd., Krebs Pigment & Color Corp., D. H. Litter Co., Monsanto Chemical Co., The National Sherardizing Machine Co., Naugatuck Chemical Division of United States Rubber Products, Inc., New England Whiting Co., New Jersey Zinc Sales Co., Panther-Panco Rubber Co., Inc., Pequanoc Rubber Co., Plymouth Rubber Co., Pratt & Lambert, Inc., Quabaug Rubber Co., *The Rubber Age*, Russell Box Co., A. Schulman, Inc., Henry L. Scott Co., Stamford Rubber Supply Co., J. P. Stevens Co., Stowe & Woodward, Inc., Taylor Instrument Cos., The Texas Co., Thompson Weinman & Co., Inc., Titanium Pigment Co., Inc., United Carbon Co., R. T. Vanderbilt Co., Vultex Chemical Co., Webster Cement Co., L. G. Whittemore, Inc., Wishnick-Tumpeer, Inc.

The next meeting of Boston Group will be held on November 4, 1938; details will be made known later.

New York Group

ON FRIDAY, September 16, the New York Group, Rubber Division, A.C.S., will meet at the Building Trades Club, 2 Park Ave., New York, N. Y. A technical paper, entitled "Effect of Temperature on the Mechanism of Oxidation of Rubber," prepared by

A. R. Kemp and J. H. Ingmanson, will be presented at the meeting by Mr. Ingmanson. The paper, originally scheduled for presentation at the since-cancelled meeting of the Rubber Division at Milwaukee, is the second of a series on the subject of oxidation and deals with the results of studies on the rate of oxidation of vulcanized rubber compounds, with and without anti-oxidants, at various temperatures.

The non-rubber feature of the program will be a talk on "Science in Crime" by Quinn Tamm, of the Federal Bureau of Investigation. Mr. Tamm, who was delegated by J. Edgar Hoover, F. B. I. chief, to appear before the group is well versed on the subject of criminology, and those attending will have an opportunity to receive first-hand information on the activities and methods of this popular federal bureau. Tickets for the meeting are $2 each and may be obtained from the group secretary, Peter P. Pinto, *The Rubber Age*, 250 W. 57th St., New York, N. Y.

Los Angeles Group

THE Los Angeles Group, Rubber Division, A.C.S., will hold its first fall meeting on October 4 at the Mayfair Hotel, Los Angeles, Calif. Details, which have not yet been completed, will be announced later.

Rubber Symposium

A SYMPOSIUM on rubber will be sponsored by the Committee on Rubber and Plastics at the fall meeting of the American Society of Mechanical Engineers, to be held at the Providence-Biltmore Hotel, Providence, R. I., October 5 to 7. The papers to be presented at this meeting will particularly emphasize mechanical problems in the production and use of rubber. These are:

Session 1, October 5, 9:30 a.m.: (1.) "The Engineering History of Rubber," Dr. W. C. Geer, Ithaca, N. Y. (2.) "Synthetic Substances with Rubber-like Properties," E. R. Bridgwater, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Session 2, October 5, 2:00 p.m.: (1.) "Problems in the Production of Rubber," E. G. Kimmich, Goodyear Tire & Rubber Co., Akron, O. (2.) "The Mechanical Characteristics of Rubber," F. L. Haushalter, B. F. Goodrich Co., Akron.

The Committee on Rubber and Plastics will meet the evening of October 5 to discuss projects for 1939 and 1940. Technical representatives of companies engaged in either the production or the use of rubber and plastics are invited to attend.

On the afternoon of October 6, A.S.M.E. members and visitors at the convention will be entertained with an inspection trip through the Providence plant of the United States Rubber Co.

Plastic Flow Formula

AS THE result of research on such dispersions as petroleum jelly, cup and fiber grease, shortening, clay and lime pastes, and cement mortars, Paul S. Roller, of the United States Department of the Interior, Bureau of Mines, Experiment Station, College Park, Md., will give a paper on September 7 before the Colloid Division, A. C. S., in Milwaukee, Wis. The abstract of the paper follows.

Definition of plasticity is considered, and methods for measuring plasticity are reviewed. The method based on measurement of the variables of shearing stress and rate of shear, in other words, of viscous resistance, is judged to be wrong in principle.

The present approach is founded on investigation of the relation between compressive stress and deformation for various dispersions. The term "dispersion," used here in a wider sense than usual, is meant to include not only dispersions in which the disperse phase is colloidal, but also those in which the disperse particles are miscroscopic and even granular in size.

A general law of plastic flow of dispersions was found to be obeyed, which is as follows: $K = \frac{dp/p}{dv/v}$, where p is the pressure, v the volume, and dv the increment of plastic deformation corresponding to an increment, dp, of stress. It is observed from this law that dispersions exhibit "strain hardening" like metals. The equation may be written in the following form: $K = \frac{\log p/p_o}{\log h_o/h}$. Constant K is called the coefficient of renitence, and constant p_o is easily seen to be the yield value.

The constants K and p_o are determinants of the plastic behavior of a dispersion. It is significant that K depends only on the kind of phases present, not on their relative amount. It is shown that K is a measure of the ease of extensive deformation, that is, a quantitative measure of plasticity properly defined. Introduced as a function of the yield value is a quantity called the liquid retention. The latter varies similarly to the coefficient of renitence, but not exactly. When the renitence is low, and the material therefore plastic, the liquid retention is a measure of the cohesiveness. Thus a ball clay and a kaolin were found to have about the same plasticity (same K), but a different retention and correspondingly a different degree of cohesiveness.

The effect of rate of stress is considered and found to be small.

The subject of plastic flow of dispersions is treated theoretically from the standpoint of the factors that determine the force of attraction between the disperse particles: namely, electrokinetic potential, solvation, and dispersity. Good agreement between the theoretically expected results and experiment is obtained.

Rubber Concrete

"UCRETE" rubber concrete for paths, floors, roads, roofs, playgrounds, tennis courts, etc., comprises a mixture of special rubber solution and concrete powder, supplied separately so that the user can obtain the desired physical properties in the finished product. Thus, if rubber-like qualities are required, the proportion of rubber solution is kept high; while, should the user desire a harder product, more of the concrete powder is used. Various intermediate combinations of the properties of both rubber and concrete may be obtained by varying the proportions of the two components. When mixed, "Ucrete" is plastic and can be molded by hand or machine into any desired shape. It also can be applied with a trowel, and the finished product can be cut, sawed, or drilled. As the new composition sets like cement, it is not dependent upon evaporation.

With strong adhesive properties "Ucrete" will adhere to glass or smooth metals, making it suitable as a jointless lining for tanks. Owing to its rubber content, the new material can be used for waterproofing purposes and may be applied to a wet surface. Colored concrete powders are also available.

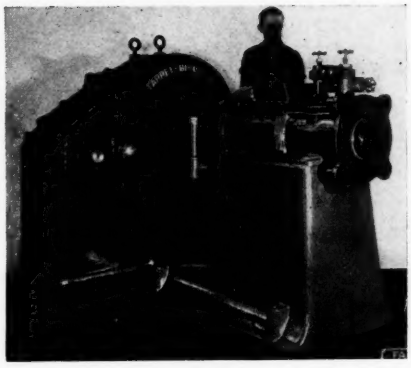
New Lubricant for Rubber

A non-petroleum lubricant for use as an anti-squeak for all rubber parts and metal-to-metal contacts on the chassis of automobiles, busses, and trucks has been developed in the research laboratories of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The new product, known as "Orel," resulted from the efforts of du Pont chemists to provide a lubricant harmless to rubber, yet one that would quickly penetrate and efficiently lubricate rubber bearings and all metal-to-metal chassis bearings. The lubricant is not for use where it will come in contact with car-body finishes or in the crankcase, transmission, differential, or pressure lubrication fittings.

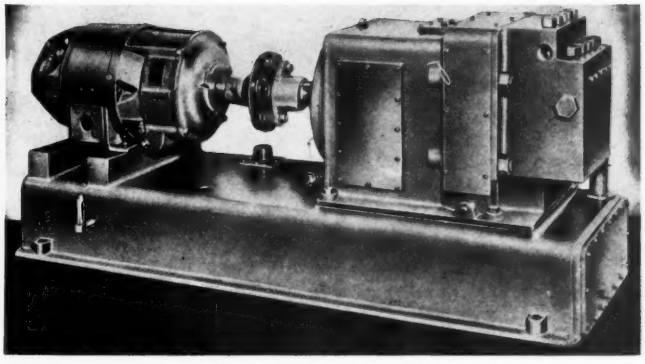
Anti-Foaming Agent

Octyl alcohol, when used in small but definite proportions, has proved to be a valuable anti-foaming agent effecting important economies in industrial operations where foaming is a problem. Research experimentation on the use of octyl alcohol as a defoamer for rubber latex has shown that the maximum defoaming effect for latex is obtained with a concentration of alcohol equal to its solubility in water or about 0.14% by weight at 25° C. Too high concentrations may increase instead of prevent foaming. Other important applications of this alcohol are for chemical processing, textile printing, paper processing, air conditioning sprays, photographic developing, grinding dispersions, and asphalt emulsions.

New Machines and Appliances



Improved Tuber



Compact Uniflo Pump

Modern Six-Inch Tubing Machine

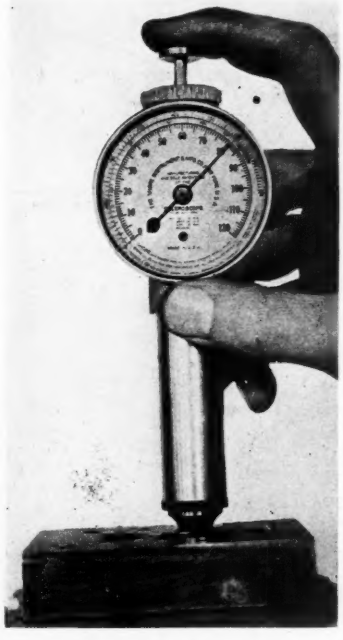
RETAINING the roller feed and other advantageous features of previous models, an improved, streamlined six-inch tubing machine has been designed with simplified construction to give greater durability and decreased maintenance requirements. For ease of disassembly the cylinder is made in two parts so that the forward section containing the screw can be removed without disturbing the rear section containing the driving spindle and feed roller gearing. The design of the cylinder liner provides ease of replacement and employs material of maximum resistance at the point of greatest wear. By keeping the cylinder filled to capacity, it is claimed, the roller feed insures constant pressure in the head and a uniform section of extruded stock. The constant pitch screw eliminates choking near the die end.

The new tuber is streamlined for improved appearance and for facilitating cleanliness. A heavy, cast Meehanite base supports the cylinder and contains the double reduction, herringbone gear drive. All bearings, including the thrust bearing, are of anti-friction roller type. According to requirements, the motor may be located on either side. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Improved Hydraulic Pressure Pump

UNIFLO, an improved hydraulic pressure pump, different from pumps of the reciprocating plunger type, represents a combination of the "swash-plate" form of operating mechanism with conventional packed plunger and poppet valve features. This arrangement is said to provide for compactness, enclosed operating parts, minimum pulsation in delivery, and high efficiency. The Uniflo pump will handle oil, water, or any other hydraulic medium and, while designed primarily for high pressure service, may be adapted, through the use of special pump bodies and plungers, for low pressures or for service and corrosive liquids.

The hydraulic section is a single-piece steel forging drilled for plungers and valves. The arrangement of passages and valves permits the plungers to be disposed in a circular arrangement with transverse suction and discharge passages extending through the block. The position of the valves and bonnets is such that they are readily accessible without disturbing the piping. Completely enclosed, the power unit is entirely separate from the hydraulic end of the pump. Uniflo pumps are made in standard sizes from two to 100 h.p. for pressures of 1,500 pounds per square inch and upward. Pumps up to 7½ h.p. have five plungers; while larger sizes have seven. Sizes up to 25 h.p., through the use of variable speed transmission, can be adapted to variable delivery. The Watson-Stillman Co.

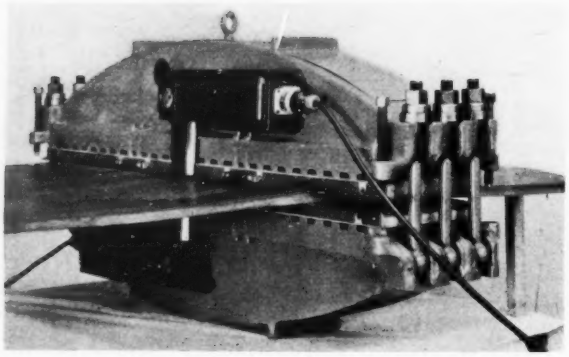


Hardness Tester

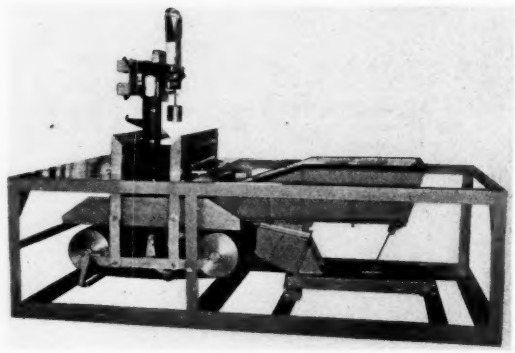
Tool-Makers' Portable Scleroscope

TO FILL a need of a convenient size and an inexpensive portable hardness tester a new pocket size instrument, known as Model "E," has been developed for determining the hardness of metals, plastics, and hard rubber. Designed somewhat after the well-known and larger Model "D," the new instrument utilizes the same Shore-Brinell conversion hardness scale, a diamond pointed hammer, and an improved clutch mechanism. The tester is six inches long and weighs one pound.

In making hardness tests the instrument is placed on the work in an upright position. A small button on top is pressed which releases the hammer. After striking the test piece, the hammer rebounds; the height of rebound depends upon the hardness of the material which is recorded on the dial scale. To facilitate a more general application of the new tester suitable attachments for supporting the instrument are supplied. The Shore Instrument & Mfg. Co., Inc., Jamaica, Long Island, N. Y.



Goodrich Belt Vulcanizer



Syntron Weigh Feeder

Combination Belt Vulcanizer

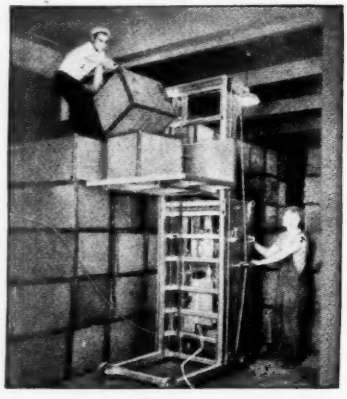
A NEW light-weight, low-cost vulcanizer for vulcanizing belts up to 60 inches in width weighs 1,650 pounds and, electrically heated, has a total power requirement of 5,000 watts. Known as the 48-60 vulcanizer, the new apparatus has three hinged bolts at each side and is rectangular in shape with platens 65½ by 12 inches in size. Thus it is possible to place the vulcanizer at a 10° angle on a 60-inch belt, at a 22° angle on a 54-inch belt, and at a 30° angle on a 48-inch belt. By placing the vulcanizer at less than a right angle to the edges of the belt, an angular splice can be made; any slight inequalities on the surface of the belt along the margin of the vulcanized portion will then pass over the pulleys at an angle instead of straight across, giving longer life to the splice. Placing the vulcanizer parallel with the splice angle reduces the number of heats necessary to complete the splice. The B. F. Goodrich Co.

Continuous Weigh Feeder

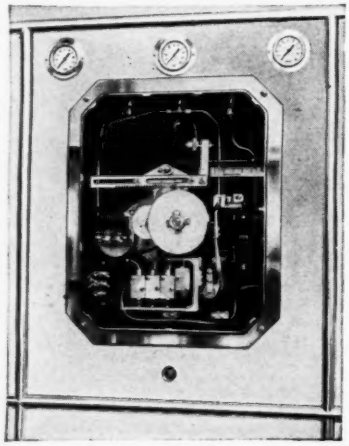
AN AUTOMATIC, continuous weigh feeder that provides a steady flow of weighed bulk materials is made up of a vibratory feeder conveyer discharging on to a constant speed belt conveyer suspended from a scale having sensitive electric valves. Designed to handle such materials as dry compounding ingredients and chemicals, the vibratory feeder is of the pulsating, electro-magnet type and conveys by vibration in such a way that the flow of the material simulates that of water. The speed of the vibratory feeder, and thus its discharge rate, is controlled by the electric valves which function on the slightest under-weight or over-weight of the scale beam. As a result, a constant load by weight, is maintained at all times on the constant speed belt conveyer, assuring a steady and continued flow of material by weight per hour. The scale functions purely as a scale, exerting no mechanical power to operate its electric control valves. Feeders are made which range from 25 pounds to 25 tons per hour. Syntron Co.

Portable Electric Lifter

SEVERAL innovations in design are embodied in a new portable electric lifter in which two heavy-duty roller chains, either of which can handle the limit capacity load alone, are used for lifting the platform. When passing through doors and moving under overhead obstructions, the top section can be folded over with a few turns of a convenient handle. The lifter is powered with a high torque, ball-bearing motor equipped with a built-in electric brake. The heavy reduction unit is totally enclosed and runs in oil, and ball bearing wheels and sprockets are used throughout. A line switch with thermal overload relay cuts off the motor should there be excessive overload at any time. The unit is made in sizes up to 30 feet high and with capacities up to 10,000 pounds. The Service Caster & Truck Co.



Electric Lifter Handling Crude Rubber



Taylor Adjustable Time-Cycle Controller

Controllers Provide "Bumping" of Platen Presses

IN THE molding of plastics and mechanical rubber goods such as golf balls, rubber heels, drive belts, etc., one of the sources of flaws is the trapping of air or gas bubbles which form pits or pock marks on the product surface. These flaws are preventable by slightly and momentarily opening the press (an operation known as "bumping" or "cracking") several times at the beginning or near the end of the curing cycle, depending on the product being processed. The pressure on the product should be released only sufficiently to permit the escape of the entrapped air or gas.

A method of automatic "bumping" has been developed as an auxiliary function of adjustable and fixed-cam types of pneumatic time-cycle controllers used for automatically regulating the curing period. With this new feature either type of timer will "bump" the press at the start of the curing period or at some later interval, as required; the "bumping" operation is independent of both time and press-ram travel. The "bumping" takes place only when ram pressure has been built up to a predetermined value sufficient to drive the entrapped air or gas to the surface of the product where it can escape. If the operation occurred at a fixed time or at a fixed point of ram travel, the required ram pressure for proper "bumping" might not be attained. In addition to obtaining maximum "bumping" efficiency, this new automatic feature is claimed to relieve the operator of an important function, permitting him to perform other duties. Taylor Instrument Cos., Rochester, N. Y.

New Goods and Specialties

Multi-Flex Marker

Health-O-Swim Nose Clip

Rubber Sideline Marker

TO AID in the elimination of injuries in football, a sideline marker made entirely of rubber, has been developed. The new marker will bend easily when struck by a falling player, flexibility immediately restoring it to the vertical position. Steel receptacles placed under the ground are used to hold the markers in place. When the markers are not in use, the receptacles are plugged to keep out rain and dirt. Each marker is ten inches in height and nine inches wide to give sufficient visibility. Multi-Flex Rubber Sideline Marker Co.

Nose Clip for Swimming

THE Health-O-Swim nose clip, a rubberized metal arch with a narrow elastic band attached to it, is a device to teach correct breathing while swimming and at the same time protect the user against sinus, mastoid infections, and ear trouble. The arched metal clamps the nostrils together tightly and shuts off the passage of air and water through the nose and into the sinuses, air spaces of the nose, and interior of the ears. The Health-O-Swim Nose Clip Co.

Rubber-Leather Heel

THE English Custom Heel comprises a flat wood core molded into the top face of a rubber heel which has a recess on the forward part of the wearing surface to allow for a flat leather segment. The new construction provides the characteristics of a leather heel plus the added comfort and wear of a rubber heel. The wood core base prevents spreading of the rubber when nailing the heel to the shoe. The Goodyear Tire & Rubber Co.

Shock Absorber Valve

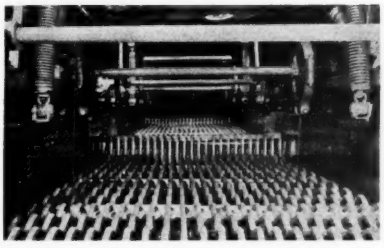
UTILIZING a combination of oil and air under pressures of from 400 to 1,000 pounds per square inch, a new pneudraulic shock absorber has been designed by aircraft engineers for use on plane struts where they are said to "cushion" effectively the jolts from the hardest landing. In order to maintain the high pressures within the shock absorber an efficient sealing material must be used between the interior and the exterior of the valve. Neoprene, which is oil-resistant as well as resilient and firm, was adopted for this unique application; in the accompanying illustration is shown the inside part of the valve with the Neoprene seal in place. Dill Mfg. Co.

Interior of Shock Absorber Valve

"Skid-Ring" Pneumatic Tire

"Skid-Ring" Tractor Tire

THE engineering principles incorporated in front steel wheels of farm tractors have been applied to rubber in developing an entirely new type of front wheel pneumatic tire for agricultural service. The tire, known as the "Skid-Ring," has a rubber flange extending outward approximately an inch from the center of the tire, giving it performance characteristics and appearance which, it is claimed, are different from any other pneumatic tire ever constructed. The B. F. Goodrich Co.

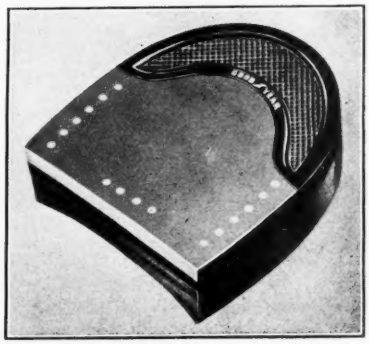


Neoprene-Protected Fruit Washer

Fruit Washing Machine

CORROSIVE conditions so severe that they rapidly destroy non-ferrous metals especially alloyed for corrosion resistance are encountered in washing fruit. The metal previously used in the construction of a machine for washing fruit was subjected to various solutions of soda ash, sodium silicate, muriatic acid, light mineral oils, and different wetting agents. To reduce the rate of deterioration of the machine's working parts the idea of protecting the metal with Neoprene was conceived.

The fruit washer consists of a grid made out of $\frac{5}{16}$-inch cold rolled steel bent to the desired shape, covered with a tube of Neoprene, and sealed at each end with a plug of the same material. The grid, which operates in a tank, is actuated by eccentrics in such a manner that it moves forward and up, returning to its original position below the surface of the washing solution. The fruit is fed on to the grid at one end of the tank, and the grid movement with the restraining action of the solution causes the fruit to move to the opposite end where it is deposited on a lattice-like step which is always in mesh with the grid. The Neoprene covered rods which form the grid are mounted between blocks of eastern maple and held together by rods of ½-inch monel metal. As these tie rods are entirely covered by the wooden blocks, they are not subject to corrosion. Fruit Packers Supply & Equipment Co.



English Custom Heel

Rubber Industry in America

FINANCIAL

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

American Zinc, Lead & Smelting Co., St. Louis, Mo., and wholly owned subsidiaries. Twelve months to June 30: net loss, $40,308, against a net profit of $258,577, or $3.99 a share on 64,834 shares of prior preferred stock, for the twelve months to June 30, 1937. Quarter ended June 30: net loss, $64,687, against a net profit of $81,074, or $1.25 a share on the prior preferred stock, in the previous June quarter of 1937.

Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y., and subsidiaries. Second quarter: net loss, $172,343, against profit of $834,042, or $1.98 a share, in the 1937 period; profit on manufacturing operations, $544,763, against $1,809,586; total income, $550,-440, against $1,812,274; expenses, $508,693, against $560,272; retirement reserves, $214,090, against $251,131. There were no federal income taxes, against $166,829 in the 1937 period.

Armstrong Cork Co., Lancaster, Pa. Six months to June 30: net profit, $285,-093, after federal income tax, equivalent to 20¢ a share on the common stock, compared with $3,825,030 for the first half of 1937.

Baldwin Rubber Co., Pontiac, Mich. Nine months ended June 30: net profit, $24,740, equal to 7¢ each on 316,757 shares. June quarter: net loss, $17,542, against $31,675 loss in the preceding quarter and net profit of $159,616, or 57¢ each on 278,604 shares, in the June quarter last year.

Barber Asphalt Corp., Philadelphia, Pa. Six months to June 30: net loss, $270,109, against net profit last year of $402,794, equal to $1.03 each on 390,-223 shares of capital stock. Twelve months to June 30: net profit, $70,994, compared with $775,772 earned for the 12 months to June 30, 1937.

Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., and subsidiaries. First half of 1938: net profit, $1,377,-072, including $1,920 profit on sale of securities and after deductions, equal to $2.56 a share on 537,406 no-par shares of common stock outstanding, excluding 1,014 shares in treasury; contrasted with net profit, including $121,425 profit on sale of securities, of $2,520,686, equal to $4.69 a share in the first half of 1937. Quarter ended June 30, net profit, $669,917, equal to $1.24 a share, against $1,072,150, or $1.99 a share in the June quarter of 1937 and $707,155, or $1.32 a share, in the quarter ended March 31, 1938. Current assets as of June 30, 1938, including $2,951,040 cash and marketable securities, at cost, totaled $6,114,337; current liabilities, $1,155,261; compared with cash and marketable securities of $3,254,000, current assets of $6,714,934, and current liabilities of $1,170,611 on June 30, 1937. Inventories were $1,949,117, against $1,511,257.

Dayton Rubber Mfg. Co., Dayton, O. Eight months to June 25: net profit before excess profits taxes and surtax, $251,966, equal, after preferred dividend requirements, to $1.07 each on 176,839 common shares.

Detroit Gasket & Mfg. Co., Detroit, Mich. Six months to June 30: net loss, $4,147, against net profit last year of $400,168, equal, after dividend requirements on preferred stock, to $1.69 a share on 214,250 shares of common stock.

Fisk Rubber Corp., Chicopee Falls, Mass., and subsidiaries. Six months to June 30: net profit, $172,298, equal after dividend requirements on $6 preferred stock, to 15¢ each on 439,535 shares of common stock, compared with $435,962, or 75¢ a common share last year; net sales totaled $6,919,928 against $9,147,-995.

Flintkote Co., R.C.A. Bldg., New York, N. Y., and subsidiaries. Twenty-eight weeks to July 16: net income, $269,627, equal to 40¢ a share on 670,-346 shares of stock outstanding, against $659,233, or 98¢ a share for corresponding period a year ago. Sixteen weeks to July 16: net income, $266,230, or 40¢ a share, against $465,648, or 70¢ a share for the 16 weeks ended on July 17, 1937. Fifty-two weeks to July 16: net income $615,817, equal to 92¢ a share, against $1,358,868, or $2.03 a share for the 52 weeks ended July 17, 1937. Net sales for the 28 weeks ended on July 16 totaled $7,299,358, against $8,213,211 in the same period last year; while sales for the 16 weeks ended July 16 aggregated $4,466,174, against $4,900,143 in the similar weeks of 1937.

General Cable Corp., 420 Lexington Ave., New York, N. Y. Six months ended June 30: net loss, $326,230, against net profit last year of $1,956,-576, equal after dividend requirements on 7% preferred stock and class A stock to $1.26 each on 550,730 no par common shares. June quarter: net loss, $260,083, against loss of $66,147 in the preceding quarter and net profit of $1,068,924, equal after dividend requirements on 7% preferred and class A stocks to 79¢ each on 550,730 shares of no par common stock, in the second quarter of 1937.

The B. F. Goodrich Co., Akron, O., and subsidiaries. First half of 1938: net loss, $209,551, against net profit for the similar period in 1937 of $3,510,698 including $519,616 net profit on foreign exchange, and after charges, federal income taxes, and provision of $500,000 for contingencies, equal after preferred dividend requirements, to $1.90 a share on 1,303,255 common shares. Net sales for the first half of 1938 totaled $51,-913,986, against $78,566,619 in the same period of last year. As of June 30, 1938, current assets were $73,485,256; current liabilities, $12,613,780. Domestic bank loans amounted to $3,500,000 at June 30, 1938.

Goodyear Tire & Rubber Co., Akron, O. First half of 1938: consolidated earnings, $3,507,320 before interest and other charges, resulting in net consolidated earnings of $1,669,828 after depreciation, interest, dividends and equity in undistributed earnings of subsidiaries not wholly-owned, federal income taxes, etc., equal after dividend requirements on 650,468 shares of $5 preferred stock, to 2¢ a share on 2,-059,060 no-par shares of common stock outstanding. This compares with net profit for the first half of 1937 of $8,068,352 after deducting $1,500,000 contingent reserve, equal after dividend requirements on $7 and $5 preferred stocks then outstanding, to $3.18 a share on 1,999,081 common shares outstanding at the close of that period. Net sales for the first six months of 1938, $78,151,636, against $116,475,700 in the similar period of 1937. Current assets as of June 30, 1938, including $15,779,005 cash and Canadian Government securities, totaled $106,118,140; current liabilities, $9,206,682. This compares with cash and Canadian Government securities of $12,998,333, current assets of $120,594,368, and current liabilities of $13,486,966, on June 30, 1937. Inventories were $67,293,399, against $76,844,465.

Hercules Powder Co., Wilmington,

Del. First half of 1938: net earnings: $1,227,134, after depreciation and federal taxes. After payment of preferred dividends, the earnings equaled 73¢ each on an average of 1,316,710 shares of common stock outstanding. In the first half of 1937 net earnings were $3,037,012, equal after payment of preferred dividends to $4.70 each on an average of 590,722 common shares then outstanding. Dividends of 65¢ a share were paid on the common stock in the period.

Monsanto Chemical Co., St. Louis, Mo. Second quarter ended June 30: net income, $555,424, which, after deduction for preferred dividend requirements and minority interests, equals 37½¢ a share on the 1,241,816 shares outstanding; compared with earnings for the comparable period in 1937 of $1,441,405, or $1.29 a share on the 1,114,408 shares then outstanding. Earnings applicable to common stock for the first half of 1938 amount to $1,224,734, which, after provision for dividend requirements and minority interests, is equivalent to 89¢ on the average number of shares outstanding compared with $2.49 a share for the first half of 1937. The second quarter consolidated domestic sales decreased 36.4% from the corresponding and record 1937 period. 1937 sales of the newly acquired Plastics Division are included in this comparison.

In the stockholders' message, President Edgar M. Queeny stated that the company's new phosphate project at Monsanto, Tenn., now is operating on an improved basis, is no longer a burden on earnings, and that original estimates of cost will be realized within nine months. The Plastics Division, which was The Fiberloid Corp. before its acquisition by Monsanto on April 1, 1938, is not operating on a satisfactory basis, he said, because of its dependence to a great extent on the customer demand for products of the automotive and other plastics consuming industries.

National Lead Co., 111 Broadway, New York, N. Y. Six months to June 30: net profit, $1,804, equivalent after preferred A and B dividend requirements to 27¢ each on 3,095,100 shares of $10 par common stock, excluding treasury shares. Last year $5,192,266, or $1.36 a common share, was earned. Current assets as of June 30, 1938, including $7,458,999 cash and marketable securities, totaled $35,599,335, and current liabilities, $4,958,964. This compares with cash and marketable securities of $9,981,512, current assets of $43,129,933, and current liabilities of $6,145.333 on June 30, 1937. Inventories were $20,388,249, against $22,097,055.

National Rubber Machinery Co., Akron, O. Six months to June 30: net profit, $82,729, equal to 54¢ a share on 154,000 common shares.

New Jersey Zinc Co., 160 Front St., New York, N. Y. Quarter ended June 30: net profit, $734,262, equal to 37¢ a share on 1,963,264 shares of capital stock. This compares with $2,181,941, or $1.11 a share, in the June quarter of 1937 and $652,596, or 33¢ a share, in the quarter ended March 31, 1938. Six months ended June 30: net profit, $1,386,858, equal to 70¢ a share, against $4,351,782, or $2.21 a share, in the first half of 1937.

Philadelphia Insulated Wire Co., Philadelphia, Pa. Six months to June 30: net loss, $60,706, against net profit last year of $17,455, equal to 94¢ each on 18,525 no-par capital shares.

Pharis Tire & Rubber Co., Newark, O. Six months ended June 30: net profit, $224,116, equal to $1.02 each on 220,000 common shares, compared with $23,673, or 10¢ a share, a year before. Gross sales, $3,882,060, against $3,451,774. Total current assets of $1,690,874, including cash of $315,391, compared with total current liabilities of $667,080 on June 30, 1938.

Raybestos-Manhattan, Inc., Passaic, N. J. Quarter to June 30: net loss, $43,101.21, after all costs and expenses including $184,306.22 for depreciation and $132,005.10 for taxes, but before $87,801.72 for full settlement and expenses of litigation long pending and aggregating over $3,000,000, contrasted with a net loss of $171,448.37, after $188,572.32 for depreciation and $126,438.74 for taxes, in the first quarter this year.

Skelly Oil Co., 121 W. Wacker Dr., Chicago, Ill. Three months to June 30: net income, $613,471, equal, after preferred dividend requirements, to 52¢ each on the 995,348 common shares outstanding, against $1,901,504, or $1.79 a common share in the June quarter of 1937. Six months ended June 30: net income, $1,278,241, or $1.09 a common share, against $3,435,917, or $3.22 a common share, in the same period last year. Operating and general expenses in the first half of 1938 totaled $12,940,859 against $11,935,981 in the same 1937 period; while depreciation, depletion, etc., this year took $3,402,676 against $3,892,194 in 1937. Twelve months ended June 30: net profit, $4,330,670, equal to $3.95 a share on common, against $6,082,395, or $5.65 a common share, for the year ended June 30,1937.

Thermoid Co., Trenton, N. J., and domestic subsidiary. Six months to June 30: net loss, $79,632, against net profit last year of $260,281, equal after $3 preferred dividend requirements, to 40¢ a share on 469,823 common shares. June quarter: net profit, $16,109, or 40¢ a share on 39,956 shares on $10 par preferred stock, against net loss in March quarter of $95,741 and net profit in 1937 June quarter of $109,887, or 16¢ a share on common.

United Carbon Co., Charleston, W. Va., and subsidiaries. Six months to June 30: net profit, $813,049, equal to $2.04 a share on 397,885 shares of common stock, compared with a net profit of $1,365,368, or $3.43 a common share, in the first half of 1937.

United States Rubber Co., 1790 Broadway, New York, N. Y., and 39 subsidiaries (on a new basis of full consolidation). Six months ending June 30: net sales, $67,829,786; net loss, $239,213 after all current charges including inventory adjustments of $1,775,365 and after deducting the net income applicable to minority interests in subsidiaries. As consolidated heretofore, net sales were $61,457,244, a decrease of $33,318,694 or 35%, compared to the first six months of 1937. The net loss for the period was $1,284,280 after all current charges including inventory adjustments of $1,839,817. Provision for federal income taxes has been made by each of the companies at the full corporate rate of 19%, less the 2½% credit on dividends paid by subsidiaries. The plantations activities are now included in the full consolidation. Expressed separately as heretofore, these activities had a profit of $198,718 after provision for depreciation and amortization of $937,547, and all other charges. Capital surplus, $11,159,633 on June 30, 1938, against a deficit of $10,471,627, on December 31, 1937. The company's net current assets, full consolidation, were $62,375,786 on June 30, 1938, compared with $57,939,342 for the same date as consolidated heretofore, and $63,541,453 on December 31, 1937. Ratio of current assets to current liabilities, full consolidation, was 3.56 to 1 on June 30 last; as compared with 3.62 to 1 on the old basis, and compares with 3.37 to 1 as of December 31, 1937. The net value of properties, plants, and equipment, was $79,733,840, full consolidation; compared with $50,888,605 for the same six months ending June 30, 1938, as consolidated heretofore. This increase in properties assets is due largely to the inclusion in the new consolidation of the $23,518,515 investment in plantations.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. First half of 1938: net income, $4,500,602, against $11,331,772 for the similar 1937 period. Net income for the 12 months was $13,295,238, against $18,493,085 for the year ending June 30, 1937. Sales billed for the first half of 1938 were $82,808,754, against $101,861,631 for the first half of 1937. Sales billed for the 12 months were $187,295,430, against $179,102,495 for the same period in 1937. Orders booked for the first half of 1938 were $76,713,806, compared with $142,209,475 for the same period in 1937. For the 12 months ending June 30, 1938, orders were $164,044,392, against $235,850,719 for the same period in 1937. Unfilled orders at June 30, 1938, were $50,431,961, contrasted with $83,725,878 at June 30, 1937.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. Six

(*Continued on page* 55)

OBITUARY

Associated News, Inc.

Walter L. Davol

Walter L. Davol

ON AUGUST 2, Walter Livingston Davol, of the Davol Rubber Co., Providence, R. I., passed away as the result of a sudden heart attack. After the World War he joined the sales department of the company and later was made assistant sales manager. In 1934 he became assistant managing executive, in 1936, assistant treasurer also, and last year was elected vice president, secretary, and assistant treasurer.

Mr. Davol was born in Providence on January 27, 1893, and was educated at Worcester Academy and Brown University. Then he was engaged in the distribution of automobiles. When the United States entered the World War, he enlisted in the Navy, serving until March 19, 1919, when he was honorably discharged as a machinist's mate.

He was a 32nd degree Mason, a past commander of Stark-Parker Post, American Legion, a member of the Gibbs Royal Arch Chapter, Calvary Commandery No. 13 of Knights Templar, Rhode Island Consistory of the Scottish Rite and Palentine Temple, Nobles of the Mystic Shrine, of the Watchemoket Tribe, Independent Order of Red Men, Metacomet Golf Club, and of the East Providence Town Council, 1926 through 1930, and a trustee of Worcester Academy.

Mr. Davol is survived by his wife and his mother.

The funeral was held in East Providence on August 5.

In his will, filed August 9 in the East Providence Probate Court, Mr. Davol provided a trust fund, the income of which is to go in equal parts to his widow and his mother. Upon their deaths the trust will terminate, and his estate will go substantially to the East Providence Community Fund, the Rhode Island Society for the Prevention of Cruelty to Children, and to Worcester Academy. No estimate of the amount of the estate was given. Bond was set at $50,000 with Ernest Kilcup, of the Davol company as appraiser and the Rhode Island Hospital Trust Co. as executor. He left $30,000 to a cousin; to each of his servants in his employ one year $500 and to those for more than a year $1,000. The Rhode Island Hospital receives $5,000 for the maintenance of a free bed.

H. W. Butterworth, Sr.

PNEUMONIA caused Harry W. Butterworth, Sr., chairman of the board, H. W. Butterworth & Sons Co., manufacturer of textile finishing machinery, Philadelphia, Pa., to succumb on August 3. He was born in Philadelphia, August 8, 1863, and joined his father's company in 1882. He became its secretary in 1889 and president in January, 1907. He retired in December, 1928, to become chairman of the board. His son, Harry W. Butterworth, Jr., has been head of the company since late 1935.

The deceased had belonged to the Union League and the Huntingdon Valley Country Club and had been a director of the Fire Association of Philadelphia.

He leaves his second wife, five of the six children by his first wife, who died in 1913, a brother, and a sister.

Interment took place August 5 in West Laurel Hill Cemetery.

G. M. J. Mackay

COMPLICATIONS following pleurisy-pneumonia resulted in the death, on July 29, of George Moir Johnstone Mackay, director of research at the laboratories of the American Cyanamid Co. at Stamford, Conn., since 1933. His previous positions follow: chemistry instructor, Dalhousie University, 1908-1909; chemist, Sydney Cement Co., 1909-1910; research engineer, General Electric Co., 1910-1929, in charge of insulation section of the research laboratory, 1929-1933. During the World War, Dr. Mackay worked on submarine detection methods at Newport, R. I.

He was born July 29, 1883, at Pictou, N.S., Canada, and later attended Dalhousie (B.A., 1905; M.A., 1906; LL.D., 1936) and Massachusetts Institute of Technology.

The deceased belonged to the committee on insulation, National Research Council; American Chemical Society (was a past chairman of the Western Connecticut Section); American Physical Society; American Institute of Chemists; and Nova Scotia Institute of Science.

Left behind are his wife, two sons, and a sister.

J. J. A. Jones

JOHN J. A. JONES, manufacturer of rubber stamps, died July 17 after a brief illness at his home in Schenectady, N. Y., where he was born 88 years ago. He engaged in making flexible rubber stamps from 1914 until he retired 13 years ago. Mr. Jones belonged to Royal Arcanum, 983. He leaves two daughters and a son.

Thomas A. Aspell

THOMAS A. ASPELL, recently assigned to executive sales duties by The B. F. Goodrich Co., Akron, O., died at his home in Akron, August 1 after more than a year's illness. His death came on the thirty-fourth anniversary of his joining the Goodrich organization as a carriage tire salesman in New York, N. Y., where he was born in 1884. He secured his job immediately after graduating from Packard School of Business Administration. He was later in charge of the company's commercial tire sales in the New York district.

In 1916 he went to the Mexican border as company representative and technical advisor on tires to the Army transport corps during the Villa expedition and occupied a similar government sales capacity in Washington, D. C., during the World War.

Following this assignment Mr. Aspell was sales manager of the truck and bus tire division in Akron and in January, 1928, was made assistant manager of manufacturers sales. On September 23, 1929, Mr. Aspell became general sales manager of the original equipment tire division. He had also been in charge of the company's aeronautics division and was prominent in local and national aeronautical circles.

Harris & Ewing

Thomas A. Aspell

He leaves his wife, two sons, three daughters, and one brother.

Funeral services were conducted in St. Vincent's Catholic Church, Akron, August 3. Burial was in Monroe, Mich.

Morris Michtom

MORRIS MICHTOM, 68, dean of the American doll manufacturers, died on July 21 after a lingering illness. The deceased, who was president of the Ideal Novelty & Toy Co., 23-10 43rd Ave., Long Island City, N. Y., and of the Admiar Rubber Co., 273 Van Sinderen Ave., Brooklyn, N. Y., came to this country from Russia in 1889, a penniless immigrant. After trying several occupations, he started the Ideal company in 1903. Late in 1925 the Admiar company was formed and makes molded rubber goods, sponge rubber and hard rubber products, doll parts, etc.

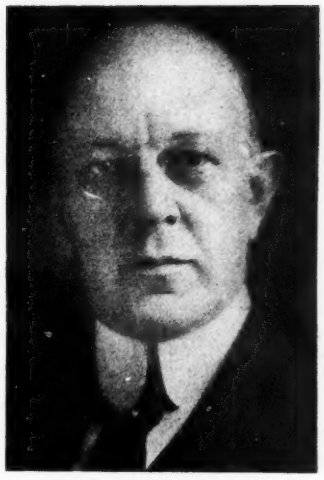
Mr. Michtom devoted much time to charitable and philanthropic causes. He was a staunch supporter of and contributed heavily to the American Ort Federation, Hebrew Sheltering & Immigrant Aid Society, the Palestine National Fund, the Jewish National Workers Alliance, Workmen's Circle, The Beth-El Hospital in Brooklyn, and many other local charities. He was a member of the board of directors of the Toy Manufacturers Association of America until compelled to retire because of illness. At the time of his death he was a member of the directorates of HIAS, The New York Council of the Jewish National Fund, The National Labor Campaign for Palestine, and the Beth-El Hospital. He was also active in The Brooklyn Jewish Center, The Jewish Teachers Seminary, the Peoples University, and Zionist organizations.

Surviving are two sons and a daughter.

Services were conducted on July 24.

Homer E. Sawyer

DEATH removed another name from the list of veterans of the rubber industry on July 27. Homer Eugene Sawyer, who died suddenly in Asheville, N. C., began his long and successful career on October 4, 1885, when, after being graduated from the English High School in Boston, Mass., he entered the factory of the Boston Rubber Shoe Co., Malden, Mass. Working successively in each department, he won several promotions, being appointed assistant superintendent and then, in 1893, general selling agent. In the meantime the company had been absorbed by United States Rubber Co., 1790 Broadway, New York, N. Y., and in June, 1901, Mr. Sawyer was made manager of sales of the consolidated footwear activities of the latter company. He held the position of general manager, footwear division, from May 23, 1913, until April 17, 1919, when he became vice president in charge of



Homer E. Sawyer

manufacturing and selling activities of footwear and clothing. On April 21, 1927, he was named to the newly created office of executive vice president and held it until he retired on a consulting arrangement April 1, 1929. Mr. Sawyer, who was placed on the company's pension roll April 1, 1931, was on the directorate from December 6, 1906, until April 2, 1929. He also served on the boards of several affiliated companies.

The deceased was very active in the affairs of the rubber industry, having been a director and a president of The Rubber Association of America, a member of the War Industries Board and of the Inter-Racial Council. He was fond of reading and sports and belonged to numerous athletic and social clubs.

The survivors are his wife, a son, and two grandchildren.

Burial was in the family plot at Holliston, Mass., where Mr. Sawyer was born August 8, 1866.

Thomas S. Goslin

A HEART ailment caused the sudden death last month of Thomas S. Goslin, assistant sales manager, machinery division, R. D. Wood Co., 400 Chestnut St., Philadelphia, Pa., with which he had been associated more than 33 years. He was born in Salem, N. J., 56 years ago.

FINANCIAL

(*Continued from page* 53)

months to June 30: net loss, $32,775, compared with a net profit of $264,458, or 88¢ a share on 300,000 common shares, in the first half of 1937.

Dewey & Almy Chemical Co., Cambridge, Mass. Six months to June 30: net profit, $77,620, against net profit of $290,700 in the same period of 1937. Sales for the first half of 1938 totaled $1,764,983, against sales of $2,291,264 recorded for the corresponding period last year.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., and subsidiaries. First half of 1938: net loss, $77,777, against net profit of $154,438, equal to 26¢ a share on 595,832 no-par shares of capital stock, excluding 173 shares in the treasury the first half of 1937. Current assets as of June 30, 1938, including $508,242 cash and demand deposits, totaled $847,679; current liabilities, $37,569. This compares with cash and demand deposits of $430,655, current assets of $709,191, and current liabilities of $52,756 on June 30, 1937.

New Incorporations

Marcelo Rubber & Latex Products, Inc., Manila, P. I. To produce American patterned rubber shoes and other rubber products.

Rebuilt Tires, Inc., Tenth Ave., Belmar, N. J. Capital 2,500 shares common, no par. M. E. and M. Van Note, 1106 Pine St., West Belmar, and E. P. Stillwell, 607 Fifth Ave., Belmar. Retread and deal in tires of all kinds.

Sam's Tire Retreading Co., Inc., 100 Beckwith Ave., Paterson, N. J. Capital 1,000 shares, no par. S. Lipton, 100 Beckwith Ave., and Y. Applebaum, 362 E. 24th St., both of Paterson, and F. Lindow, 167 Ackerman Ave., Clifton, all in N. J. To manufacture tires and inner tubes of all kinds and retread tires.

Xylos Rubber Co. of California. Capital $50,000. C. S. Peabbles, L. H. Herman, and W. T. Cunningham, all of Wilmington, Del. Deal in rubber and products thereof.

Dividends Declared

Company		Stock	Rate	Payable	Stock on Record
Armstrong Cork Co.		Pfd.	$1.00	Sept. 15	Sept. 1
Armstrong Cork Co.	4% Cum. Cv.	Pfd.	$1.00 initial q.	Sept. 15	Oct.
Canadian Wire & Cable Co.		Pfd.	$1.62½ q.	Sept. 15	Aug. 31
Detroit Gasket & Mfg. Co.		Pfd.	$0.30 q.	Sept. 1	Aug. 15
Dominion Textile Co., Ltd.		Com.	$1.25 q.	Oct. 1	Sept. 15
Dominion Textile Co., Ltd.		Pfd.	$1.75 q.	Oct. 15	Sept. 30
Firestone Tire & Rubber Co.		Pfd.	$1.50 q.	Sept. 1	Aug. 15
Hewitt Rubber Corp.		Com.	$0.10	Sept. 10	Aug. 27
Mid-West Rubber Reclaiming Co.		Pfd.	$4.00 q.	Sept. 1	Aug. 20
Norwalk Tire & Rubber Co.		Pfd.	$1.75 accum.	Aug. 18	Aug. 8
Raybestos-Manhattan Co.		Com.	$0.15	Sept. 15	Aug. 31
United Elastic Co.		Com.	$0.10	Sept. 24	Sept. 9
Westinghouse Electric & Mfg. Co.		Com.	$0.50 irregular	Aug. 31	Aug. 9
Westinghouse Electric & Mfg. Co.		Pfd.	$0.87½ irregular	Aug. 31	Aug. 9

EASTERN AND SOUTHERN

REPORTS from all over the country recently are more encouraging, and this attitude is not solely due to an optimistic spirit, but also to actual improvement in business conditions. The extent of the recovery movement, however, will largely depend upon the degree to which confidence is restored in the future prospects of private industry. At any rate indications are favorable for a moderate fall upturn. An important item is that this year is expected to produce one of the largest agricultural harvests in our history. The prices will be lower than during last year; yet the prospective abundant harvests constitute a most favorable factor in the economic outlook. Output of steel, which has rapidly advanced of late, is at about 42% of the total ingot capacity, the highest since last November. Inventories are being steadily reduced, but they are still large and almost as great as those of 1929 But the long-range outlook is obscured by the many uncertainties overhanging business enterprise. Unbalanced government budgets, the heavy taxes, unemployment, strained industrial relations, and the railroad situation are a few of the major problems of concern to all, not to mention war threats.

The automobile industry has experienced lately a turn for the better, and the outlook is the most promising since the slump started. Sales are continuing very well for this time of year. Some authorities expect a car shortage in the early fall which may hasten plans for new models. One of the most hopeful features of the situation is the fact that the proportion of cars more than eight years old is the largest in recent years. Thus a large potential demand seems to exist for new automobiles that should materialize when conditions improve.

Ford reported for July a sharp increase in retail sales of cars and trucks, which, in a contraseasonal trend, were 12% greater than in June. Over a four-year period July sales previously had averaged 7.25% under June's figure, and in only one other year since 1922, that is in 1929, were July sales totals greater than in June. Truck sales showed the largest gain, 42.5%; commercial car sales were up 17%. Truck and commercial car sales were in the greatest volume since last September.

The rubber industry also reflects the spirit of optimism and improved business lately noticed. The outlook for business and employment conditions is better for the rest of the year. Some manufacturers, of course, depend upon the automobile industry, which is now working on the 1939 models.

A maker of replacement tires stated business has shown steady improvement since May, and the seasonal upturn, compared with operations the first half of the year, was a little sharper than usual. The reason for this condition was, it is believed, that most dealers were liquidating their stocks; so in May, June, and July they had to buy in order to take care of customers' demands. Manufacturers' inventories are much improved over last year, and dealers' stocks are materially lower.

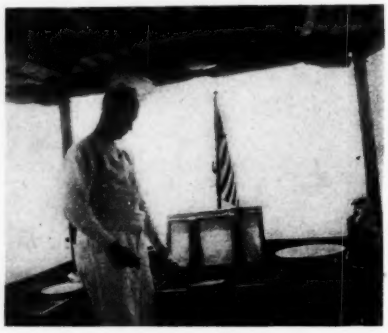
Druggists' sundries firms report a healthy increase in business the last few weeks. The causes of this, as offered by one executive, are: there has been an intensive drive to reduce inventories, and substantial inroads have been made; and the federal government's five-billion-dollar spending program has started some otherwise-slack industries.

Another concern announced that for the first half of 1938 most of its regular customers purchased less than in 1937, but some new items and accounts have offset these losses. Since July a slight increase in sales has been noted, with more marked improvement visible in the near future. There is a positive, definite feeling of encouragement for greater buying evidenced by the more eager interest from buyers.

Management Congress

The Seventh International Management Congress will be held September 19 through 23, 1938, at Washington, D. C. At this triennial meeting of world experts in the field of management, will be discussed more than 200 papers on a wide range of subjects relating to administration, production, distribution, personnel, agriculture, and the home, which have been printed in six volumes and will be distributed to all registrants prior to the congress. These papers will not be read at the simultaneous technical sessions, but will serve as the basis for discussion.

A feature of the general sessions will be the presentation of both American and foreign points of view on the most important aspects of management in relation to social and economic problems. All addresses at these sessions, plus the summaries of discussion at technical sessions, will be printed in a final seventh volume to be distributed to registrants after the congress.



"Curly" Curtis Turns Chef When on a Recent Three-Day Cruise in the Chestpeake Bay

The program of technical sessions includes: A Production Section, having as vice chairman, Wm. F. Hosford, vice president, Western Electric Co., Inc., and a session on manufacturing management, with Howard Coonley, president, Walworth Co., Inc., as chairman. A Distribution Section, vice chairman, Oliver F. Benz, director of sales, Cellophane Division, E. I. du Pont de Nemours & Co., Inc.; with a session on market analysis and sales planning, chairman, Henry G. Weaver, director, customer research staff, General Motors Corp. A Personnel Section, with a session on wage administration and incentives, chairman, W. G. Marshall, vice president, Westinghouse Electric & Mfg. Co.; a session on safety and health, chairman, D. D. Fennell, president, National Safety Council.

The program of general sessions includes a discussion of "Management's Responsibilities to Society" by A. W. Robertson, Westinghouse chairman; a session on the evening of September 20 with C. S. Ching, director of industrial and public relations, United States Rubber Products, Inc., presiding, at which President Lewis H. Brown, of Johns-Manville Corp., will consider "Management's Aims and Responsibilities," and R. Lloyd Roberts, chief labor officer, Imperial Chemical Industries, Ltd., will discuss "The Machinery for Industrial Conciliation and Arbitration in Great Britain; a presentation of the "Influence of Technical Progress upon Social Development" by Karl T. Compton, president, Massachusetts Institute of Technology; and "The Continuance of Free Enterprise" by W. J. Cameron, of Ford Motor Co.

Any one interested in the problems of management is cordially invited to participate in all sessions of this congress upon payment of a registration fee of $10, which entitles the registrant to attend all sessions and to receive the seven volumes covering the congress proceedings. Wives or others in the immediate family of a registrant may be registered upon payment of a $5 fee, which entitles the member of the registrant's family to attend all the sessions and all social events arranged for those accompanying regular congress attendants. The fees do not cover meals or refreshments. Checks made payable to Seventh International Management Congress and sent to Executive Secretary Nathaniel W. Barnes, 347 Madison Ave., New York, N. Y.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., through President Lammot du Pont, in response to a questionnaire submitted by George A. Sloan, chairman, Consumers Goods Industries Committee, reported that throughout 1938 up to about mid-June

the organization was operating 10% below the level used as a standard. Since July 1, however, du Pont has been running about 5% above the standard, thus realizing a 15% improvement in business.

F. J. Stokes Machine Co., Philadelphia, Pa., was closed from August 8 to 13 for its annual vacation period.

Cools Telephone Booths

The Safe-flex rubber bladed electric fan, which has met with nation-wide approval for home and office use, has just been accepted by the Western Electric Co. The newest adaptation is a special telephone booth model. This Western Electric approval provides for optional installation of Safe-flex fans in booths manufactured by it for the operating companies of the Bell Telephone System or in booths already in service. Patent rights to the manufacture of these rubber bladed fans are held by the Samson United Corp., Rochester, N. Y.

Trade Mark Legislation?

National Association of Secretaries of State at the August 10 meeting, Albany, N. Y., of its Committee on Trade Marks, Doris I. Byrne chairman, asked the help of business in drawing attention to defects in current state trade mark laws and methods of correcting them. The meeting was attended by about 50 representatives of associations, chambers of commerce, and corporations, and by one professional specialist in registering trade marks; 22 business representatives spoke against compulsory registration. Miss Byrne stated the committee did not intend to consider only compulsory trade mark registration as the basis of the uniform state law to be proposed, but would inquire into all phases of state trade mark law with a view to drafting a proposal to give trade mark owners the greatest protection. It was also suggested that some states might help trade mark owners by simplifying procedure difficulties in the courts and affording adequate remedies against counterfeiters.

Fourteen states already have attempted to obtain mandatory trade mark registration laws, mainly for the purpose of additional revenue, but their efforts have been defeated because business men have expressed their opposition to such legislation.

With 44 State Legislatures meeting next year this subject will have to be closely watched by business interests, especially for attempts that mean nothing but more revenue. Efforts to improve trade mark laws will have to be carefully watched to see if proposed improvements actually hold forth promise of real, practical, worth-while remedies; and if so, what will be the cost to trade mark owners.

NEW JERSEY

NEW JERSEY rubber manufacturers, holding their own at this time, look for increased business before the fall. Last month nearly all manufacturers found business picking up a little, and all but a few report it has remained so. Hard rubber production has gained; while demand for tiling also is better.

Jos. Stokes Rubber Co., Trenton, according to Secretary W. J. B. Stokes, II, has embarked upon an expansion program, the main item of which is the boiler house with two straight-tube boilers having a combined horse power of 100,000 pounds, besides five boilers in present use. The new boilers will have a working pressure of 200 pounds' capacity and are fitted up with modern coal handling equipment and accessories. The cost of this project is about $85,000. Other parts of the modernization program include a new machine shop with approximately 10,000 square feet of floor space, to take care of maintenance and mold changes and other work relative to the operation of the molding plant; and the installation of six 200-ton presses in a rubber molding department and six new Dunning & Boschert presses in a plastics department. Additional presses are contemplated before the end of the year.

Acme Rubber Mfg. Co., Trenton, finds business much improved over the previous month, with an increase also over the early spring season.

The Thermoid Co., Trenton, sent several executives to the recent sales meeting of the Globe Motorists' Supply Co., Mount Vernon, N. Y., on the occasion of Globe's taking on the Thermoid line. The new distributer is an old organization with branches throughout Westchester Co., N. Y., and adjacent territory. The Thermoid program was discussed in detail with the entire Globe sales force. Attending the meeting for Thermoid were Fred E. Schluter, president; Samuel Dennis, replacement sales director; Conny Herman, New York district manager; and Matty Winkler, New York division sales manager, who acted as chairman of the meeting. The Globe company was represented by Henry Spolter, treasurer; Herman Cuttler, president; Gerry Kaplan, purchasing agent; and G. G. Ilse, sales manager.

The engagement is announced of Miss Alice Drugan to Russell Winfield Case, Jr., Thermoid advertising manager.

Luzerne Rubber Co., Trenton, noted an improvement in orders for hard rubber products. President Bruce Bedford and his wife are on an extended tour through Europe.

Bevis Longstreth, president, Thiokol Corp., Trenton, and Mrs. Longstreth are spending some time at Nantucket Island.

Essex Rubber Co., Trenton, reported a good volume of business, with bright prospects for late fall.

Richmond's Tire Shop, Israel Richmond owner, Trenton, for the third consecutive time has been awarded by the State of New Jersey the contract for supplying pneumatic tires and tubes for the coming year. The specifications cover more than 40 sizes and call for a guarantee of 30,000 miles. The contract was estimated at $35,000 total, subject to a 30% increase or decrease.

Pierce-Roberts Rubber Co., Trenton, reduced its two working shifts to one because of a drop in orders. Clifford A. Pierce, vice president and treasurer, accompanied by his wife has been on a lengthy motor trip through New England.

The Pocono Co., Trenton, N. J., through Secretary J. A. McQuillen has announced that the plan of reorganization has been approved and completed and that a new corporation, The Pocono Co., commenced operation of business August 1. The same personnel that operated the business for the last three months of the trusteeship are the officers of the new corporation. The company reports increased orders for rubber cloth.

MIDWEST

Inland Rubber Corp., manufacturer of automobile tires and tubes, Wentworth Ave. and 27th St., Chicago, Ill., through President R. C. Gunther has announced the appointment of Kyle Menuez as comptroller. He had been associated with the India Tyre & Rubber Co. of Great Britain, Ltd., Glasgow, Scotland, and more recently with the mechanical goods division, Firestone Tire & Rubber Co., Akron, O. Before coming to Inland, Mr. Menuez assisted in the development of the new Schacht Rubber Co. mechanicals plant at Noblesville, Ind.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has transferred Edward S. Coe, Jr., from the sales engineering department of its Buffalo plant to its branch sales office at 1059 First National Bank Bldg., Chicago, Ill., to promote the sales of Farrel-Sykes herringbone gears and gear units, which are manufactured at Buffalo. Born in Worcester, Mass., Mr. Coe attended the local public schools and Worcester Polytechnic Institute, graduating in 1931. He was associated with American Steel & Wire Co. and Reed-Prentice Co. before joining Farrel.

OHIO

Goodyear Activities

The Goodyear Tire & Rubber Co., Akron, held its annual frolic on August 8 at Euclid Beach Park, Cleveland, with about 43,000 in attendance. The Goodyear Juvenile Band, composed of 70 offspring of company workers, was among those present. Busses at special rates were supplied those who had no other means of transportation. The usual games and contests were held, including a softball game in which Plant 1 defeated Plant 2, 9 to 0. A grand drawing was held, with 45 prizes divided into three groups, adults, boys, and girls. E. J. Thomas, executive vice president, and C. C. Slusser, vice president and factory manager, were among company officials present; but President Paul W. Litchfield was on the high seas, returning from South America, where he visited company interests.

To meet the increasing demand for Plioweld rubber lining material for protecting equipment against the corrosive effects of acids, alkalis, and fumes, Goodyear installed in Plant No. 3 a 90-ton curing heater, with 17-ton door inside the shell. Weighing 107 tons and measuring 45 feet long, 15 feet in diameter, this heater will be used to vulcanize Plioweld installations to various types of pressure and storage tanks, ventilating fans and equipment, pipes for abrasive conveyer and acid transmission systems, and railroad tank car shells. The curing heater has steel tracks upon which special trucks will carry various products into it for curing, during which the heavy steel door is automatically sealed to withstand steam at 75 pounds' per square inch.

Goodyear recently celebrated its fortieth birthday. The company was incorporated on July 20, 1898, but actual work in the plant began the day after the Fourth.

New Truck Tire

Goodyear has announced an improved new YKL truck tire, built of Rayotwist fabric like its predecessors, but including a special, new, ribbed-tread design. The tire's sidewalls have new ribs further to resist scuffing, with the shoulder non-skid 20 to 30% deeper than before; while the tread itself is flatter, providing more rubber contact with the road. Then there are notched, circumferential ribs in the tread center to aid in giving slow, even wear and provide traction.

Part-Sponsor of Farm Hour Broadcasts

The National Farm and Home Hour, a daily feature of the National Broadcasting Co., which for a decade has supplied American farmers with up-to-the-minute news and expert advice on rural problems, will be supplemented by sectional broadcasts through cooperation of Goodyear. The new schedule calls for regional programs of great practical value for the farm audiences in each of five major zones of the United States. Information of vital local importance, such as weather forecasts, shipping advice, commodity prices, sectional crop conditions, etc., will be offered in the regional programs, which will occupy the 15-minute period immediately following the national broadcast each Monday through Friday, beginning September 26, at 12:30 p.m. E.S.T. Goodyear will assume part of the additional cost which the new service entails by sponsoring the supplementary broadcasts in three of the five zones (the East and the two Midwest zones); while NBC will present the new program in the other two (the South and the Far West).

The National Farm and Home Hour was inaugurated October 2, 1928, with the cooperation of the United States Department of Agriculture, Association of Land Grant Colleges, National Grange, American Farm Bureau Federation, and the National Four-H Clubs for farm boys and girls. The national portion of the new program under the new plan will continue in its current form and will be prepared as at present in cooperation with the Department of Agriculture and other farm groups.

Rubber Pipe Made 81 Years Ago

While collecting material for the life of Charles Goodyear, who discovered vulcanization in 1839, Hugh Allen, public relations, Goodyear Tire & Rubber, met Mrs. Ellen M. Goodyear, 91, second cousin of the inventor, at whose home Goodyear lived when she was a child; she was 13 when he died. Mrs. Goodyear later sent Mr. Allen a rubber pipe which her cousin had made and exhibited, among other things, at the Paris Exposition of 1857. He later gave Mrs. Goodyear's mother the pipe besides rubber jewelry, furniture, and other curios which are still at the family home at North Haven, Conn. The pipe, of hard rubber with the head of the Goddess of Liberty molded into the bowl, is in excellent condition, shows no signs of wear, and still smokes perfectly. It will, however, be preserved in the Goodyear Museum at Akron.

Charles Goodyear's Pipe

Rayon in New Airwheel

Goodyear is now marketing a new Double Eagle Airwheel, the outstanding feature of which is the use of rayon instead of cotton for carcass construction. This new cord, called Rayotwist, is said to be only two-thirds as heavy as conventional cord, but 11% stronger; and since the cord is thinner, there are more Rayotwist cords to every ply. Other advantages claimed for this tire are greater ease of riding and greater mileage.

A four-ply Double Eagle is said to have greater strength, endurance, and resistance to fatigue than a six-ply tire of conventional cord, yet weighs 10% less. The tire comes in both the All-Weather tread, in a new arrangement that concentrates more road-gripping diamonds in the center to give even greater non-skid traction, and in the rib type.

Eighty-Ton Conveyer Belt

What is reported to be the largest conveyer belt ever manufactured began operation in July, 1938, at Grand Coulee Dam, State of Washington. A Goodyear product, the gigantic belt operates on centers of 4,850 feet and measures 9,700 feet long, approximately twice the length of any of its predecessors. The belt, 48-inches wide and of eight-ply construction, was manufactured in eight separate pieces weighing 10 tons each; during installation the sections were vulcanized into one continuous endless belt weighing 80 tons, 30 tons of cotton and 50 tons of compounded rubber.

Moving at a speed of 450 feet per minute, the belt carries coarse stone at the rate of 2,000 tons per hour for use in constructing the huge dam that ultimately will span the Columbia River. Supplementing the main conveyer are some additional 20,000 feet of miscellaneous belts used to gather, classify, store, recover, and transport the stone through the screening and washing plant at the source.

In the summer, when bearing friction is at a minimum, approximately 90 h.p. is required to put the belt in motion. Once the belt is fully loaded, approximately 50 h.p. is required to hold it back to the desired speed, as the installation operates "downhill." In the winter 125 h.p. will be required to start the empty belt, and 50 h.p. will be required to keep it moving, instead of being used as a retarding force as is the case in summer operation.

Goodrich News

Pioneering in the development of the commercial tire for ½- and ¾-ton equipment, The B. F. Goodrich Co., Akron, now offers the Express Type Heavy Duty Commercial for ordinary service or the new line for service where traction is a major requirement, in mud, snow, or any off-the-pavement service where the going is tough. The tire is made in a complete range of sizes. Its tread is of an entirely different appearance and with different characteristics from the ordinary design; its greater depth, it is claimed by the manufacturer, accounts for its valuable super-traction qualities.

New Directors

Arthur B. Newhall, president, Hood Rubber Co., Watertown, Mass., was appointed a Goodrich vice president and elected a director to succeed James D. Tew, former head of the company, who recently resigned from the board. Langbourne M. Williams, Jr., president, Freeport Sulphur Co., 122 E. 42nd St., New York, N. Y., also was named a director, to succeed Col. Albert A. Sprague, also resigned.

Personnel Mention

L. F. Wilson, with Goodrich and associated companies in sales capacities since 1927, was made manager of the newly created resale merchandising division of the Goodrich purchasing department, in which capacity he will buy all merchandise intended for resale by the company.

Dr. Harlan L. Trumbull, head of the Goodrich research department, recently addressed the Akron Junior Chamber of Commerce, stating America's rubber industry is progressing rapidly through a stage of laboratory developments that are the most important in history. He also said successful completion of these developments should assure the rubber industry of playing an increasingly important role in every walk of life. Among the most important of these developments, Dr. Trumbull listed: airplane de-icers and other aviation accessories, including tires; rubber linings for tanks used to store acids and other corrosive liquids; synthetics and other rubber-like materials, including Koroseal.

Fate of "Clincher" Tires

America's first automobile tire, the "clincher," is rolling into oblivion at a rate of more than 100,000 a year, according to Pete Seiler, chief inspector of the Goodrich company, who placed the first set on a machine for Alexander Winton in 1896. Still on the nation's highways are several hundred antiquated motor cars of the vintage 1924, or earlier, which have kept the "clincher" tire in the field. Last year, Mr. Seiler added, 400,000 "clinchers" were sold, but 1938 will see a 40% decline. The South and the Southwest are the principal markets for this tire, with a considerable quantity shipped to Europe. The "30 by 3" size remains the most popular, although many of the "30 by 3½" type, reminiscent of the days when the rear tires were larger than those on front wheels, are in demand.

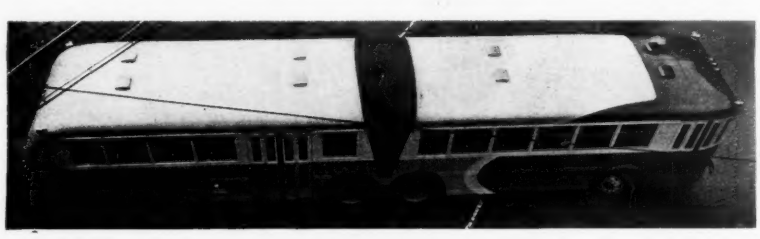
Tests of Plane Tires

Severe tire tests were conducted on the landing wheels of the giant DC-4, 42-passenger airliner built by the Douglas Aircraft Co., Santa Monica, Calif. Loads of 170,000 pounds were imposed on the main landing gear, and more than 50 "landings" were made in a special test laboratory before the ship was flown. The Goodrich tires used are five feet five inches in diameter, two feet across at the base, weigh 360 pounds, and contain 45 miles of tire cord and four miles of bead wire.

Super-Bus Tested

Test runs are being made in Akron of a new streamline, lightweight superbus, largest in the world, it is said. They resemble two coupled coaches, seat 58 passengers on a single deck, are nearly 50 feet long, weigh 27,500 pounds, and are capable of 50 miles an hour. The new busses will soon go in service in Baltimore and other cities.

A flexible rubber hood, a product of the Goodrich company, which articulates the twin-coach unit, makes for flexibility and greater passenger comfort through smoothing out any road bumps. Coordinated steering of front and rear wheels permits greater freedom of maneuverability and provides a very short turning radius, according to the Twin Coach Co., Kent, O., designer of the new busses. The slight amount of movement at the floor line is absorbed by a collapsible rubber seam, which contracts and expands only 7/8-inch; while the rubber hood allows a maximum movement of 11 inches at the roof. As there is no horizontal hinging, relative movement between body units is possible only in the vertical plane; straight alinement is maintained throughout the entire length. The vehicle bears its load on 12 tires.



Super-Twin Bus

Removing Protex Coating from White Shoes

Latex Protective Coating

A new latex compound, developed by engineers of the American Anode Co., a Goodrich associate, can be sprayed on white shoes, automobile fenders, refrigerators, instrument panels, etc., to form a soft tough film, called Protex, which protects the surface against scratches or chipping during further processing or shipping. After serving its protective purpose, Protex can be easily stripped from the object on which it has been sprayed.

J. L. Handy & Co., Inc., brokerage house, 420 Lexington Ave., New York, N. Y., has moved its Akron, O., office to Room 307, Everett Bldg., Main and Market Sts.

Ira Williams, head of the Rubber Division, Jackson Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., received from the University of Akron the honorary degree of doctor of science in recognition of his accomplishments in rubber technology, as inventor of universally used laboratory equipment, as pioneer in the research leading to the commercial development of synthetic rubber in the United States, and as an outstanding contributor to the theory of vulcanization of rubber.

The R. D. Wood Co., 400 Chestnut St., Philadelphia, Pa., has appointed Chas. C. Grant, 436 Second National Bldg., Akron, O., as its exclusive agent for the Cleveland - Akron - Northern Ohio district. Mr. Grant has long been connected with the hydraulic industry in an engineering and sales capacity, having served as engineer, chief engineer, and director of engineering for one of the largest companies in the country, whose hydraulic machinery represents a large portion of its plant equipment. Mr. Grant's efforts will be confined to the products of the hydraulic machinery division of the Wood company, which includes hydraulic presses, high pressure hydraulic valves, and special hydraulic machinery for the rubber, plastic, and metal forming industries.

NEW ENGLAND

U. S. Rubber News

The Chatham Mfg. Co., Portland, manufacturer of cut rubber thread since 1920, jointly owned by the Ansonia O. & C. Co., Ansonia, American Mills Co., New Haven, and Russell Mfg. Co., Middletown, all in Conn., recently sold its manufacturing facilities and business to United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. The plant will continue operations at Portland with the same personnel.

Naugatuck Chemical Division, Naugatuck, Conn., employes and their families held their fourth annual outing, sponsored by the Alembic Association, on August 13 at Lake Quassapaug, with about 1,100 attending. The usual field events and contests were held. The play-off game of the Naugatuck Chemical softball league went to Harold Stinson's Sluggers in a 5-4 victory over Jimmy Morrissey's Manglers. Another feature on the program was a softball game between the Chemical All-Stars and a team representing The Seamless Rubber Co., New Haven, Conn., which was also holding its annual outing at the same place, with the Seamless team on top, 8-1. This annual outing is an important event in the lives of the pensioners of Naugatuck Chemical, who, as usual, were brought in a body to the affair and tendered a dinner; 13 old-timers were present. General chairman of the outing committee was Patrick H. Kelley, president, Alembic Association.

The following Saturday more than 5,000 operators, their families, and pensioners attended the fourth annual outing held at Lake Quassapaug for workers of the Naugatuck, Conn., footwear plant of U. S. Rubber. Several committees arranged track and swimming events for adults, amusements for children, dancing, contests, and prizes, and care of the 125 retired employes present. This factory outing climaxed the series of clambakes and picnics held by each department during the summer. Twelve such affairs were held this year by production departments, with attendance varying from 60 to more than 400.

Arthur Reeve, general stock auditor of rubber commodities, U. S. Rubber, with which he has been more than 50 years, while in Providence, R. I., on his annual tour of the corporation's factories, on August 13 visited the new Auburn Public Library, of which he was one of the founders and its first treasurer, from 1888 to 1899.

David Cook Scott, Jr., of Henry L. Scott Co., Providence, R. I., has joined his fiancee, Miss Helen Safford Bonnell, of Chestnut Hill, Philadelphia, Pa., in London, England, where their engagement was recently announced and where they will be married. After a wedding trip they will make their home in Providence.

Technologist

Dr. Royce J. Noble, author of "Latex in Industries," was born forty-one years ago on June 12. He did his undergraduate work at Boston University and graduated in 1919 as a Bachelor of Science. He continued his studies at Harvard Graduate School (1918-1919) and University of Pittsburgh (1920-1922). At the latter he earned his higher degrees, M. S. and Ph.D.

Dr. Noble served as instructor at the University of Pittsburgh and later (1922-1925) taught at Lowell Textile School and Franklin Union (Boston). Then he became associated with W. B. Pratt, Inc., Boston, (1925-1929) as a research chemist. In the same capacity he was connected with Dewey & Almy Chemical Co. (1929-1930) and Goudey Gum Co. (1930-1932). Since 1932 he has been doing consulting work, specializing in natural and artificial aqueous dispersions of rubber.

He belongs to the American Chemical Society, was chairman of the Boston Group, Rubber Division; American Institute of Chemical Engineers; Institution of the Rubber Industry; and is a captain in the Chemical Warfare Service. His hobbies are tennis, stamp collecting, and wood working. In addition to being author of the above book he is also the author of several publications, patents, and papers, the latest of which was read at the recent London Rubber Conference. He was elected a fellow of the Institution of the Rubber Industry on April 27.

Dr. Noble is married and has two children. The Nobles live at 21 Woodland Road, Malden, Mass.

F. N. Joslin Co.

Royce J. Noble

Fisk Improvements

An automatic warning device enabling car owners to guard against outworn tires is now incorporated in a new safety tire manufactured by the Fisk Tire Co., Chicopee Falls, Mass., according to Factory Manager C. E. Maynard. The tread is composed of seven circumferential ribs and crosswise inserts of soft white rubber. When these white cross lines disappear, the tire has delivered its maximum mileage, Mr. Maynard said. While the traction qualities of this tire continue to increase up to the point of tread disappearance, thereafter the efficiency of any tire drops 50%, and the tire should be changed.

A newly improved sectional air bag which, it is claimed, will jump vulcanizing profits and increase efficiency is now available to tire repair shops, H. W. Brown, Fisk sundry sales manager, reported on August 22. Main feature of the patented bag is a retaining rod running the length of the bag and attached at each end to metal pieces which completely eliminate end-expansion of the bag under pressure. This results, Mr. Brown said, in greater flexibility since there is no need of cord at the dome. Increased pressure is secured. The vulcanization is more efficient and produces a better looking job. Most important is the fact that the bag will last longer than the old type, thus assuring the owner of additional profits.

Davol Rubber Co., Providence, R. I., has announced that the honorary degree of Master of Science in Business Administration was conferred upon President Ernest I. Kilcup by Bryant Commercial College, Providence, August 4, at the annual commencement exercises.

At the August meeting of the Woonasquatucket Valley Firemen's League, Marieville, North Providence, instructive discussions were conducted by E. Lloyd Hanna, Davol chemist, on rubber and by A. R. Lewis, of the same concern, on making and testing fire hose.

Providence and Pawtucket Locals of the International Brotherhood of Electrical Workers joined together for the first time at an outing on August 6, attended by more than 800 members and their families at Rocky Point, Narragansett Bay. The group included employes of Collyer Insulated Wire Co., Anaconda Wire & Cable Corp., General Cable Corp., Providence Insulated Wire Co. The day's program included field and water sports and games, shore and chicken dinners, bathing, speeches by union officials, and dancing.

Rubber Industry in Europe

GREAT BRITAIN

Restriction Extended

The chairman of the International Rubber Regulation Committee has announced that all contracting governments who are parties to the international agreement on August 9 accepted the committee's recommendation regarding the continuation of the regulation for five years after December 31, 1938.

Pneumatic Tire Jubilee

A half-century ago, on July 23, 1888, John Boyd Dunlop applied for a patent for the first pneumatic tire to receive recognition.[1] This invention, incidentally, was opposed because it was believed it would cause the scrapping of bicycle tire-making machinery and throw out of work many people engaged in the industry. There had, however, been solid tires and cushion tires before the pneumatic.

In commemoration of the important event women in bustles and a foreman in an ancient derby made bicycle tires at Fort Dunlop, England, on July 23, 1938, just as it was done in the early days. In a corner of the bicycle tire shop at the Dunlop works, constructed for the occasion in exact detail, down to the gas jets, was a replica of the first pneumatic tire shop in Dale St., Coventry. This anniversary was commemorated by 1,500 members of the Cyclists' Touring Club, celebrating its seventy-fifth birthday.

In charge of the reconstructed shop was Edward Fell, who had labored as a boy at the original place, which had employed between 80 and 90 workers, mostly women. A good salary for the men was a pound ($5) a week, and the girls earned from 9 to 12 shillings ($2.25 to $3) weekly. They put on the cement by hand. A cycle tire molder now makes £4.10s. ($22.50) a week, and the women, £2.10s. ($12.50).

Interviewed, Mr. Fell stated it then took about six hours to make a tire; now it takes a few minutes. First a strip of canvas was cemented to the wheel rim; then a rubber tube was pushed at the end of a stick round a thin canvas bag with two flaps to each edge of it. The ends of the rubber tube were cemented, and a valve plugged into it. The first valve plugs were chopped off from vulcanite knitting pins. The tube was then blown up inside its canvas bag, and one pair of flaps cemented around it, binding it firmly to the rim. Around the latter was cemented another strip of canvas, and the job was done.

According to Mr. Fell, the tires cost four guineas a pair ($21) and were fitted to your own bicycle wheels. The complete machine cost about 18 guineas ($94.50). All tires had to be returned to the shop to have punctures mended, and the repair took more than a week and cost 17 shillings and sixpence ($4.37) a tire.

Benzene was used to loosen the tire, and the atmosphere would get thick with the fumes, especially since the roof was low and the room without ventilation. Men would become intoxicated with the fumes, said Mr. Fell, and in the warm weather women would faint —"we used to carry out half a dozen women in an afternoon."

[1] For details see "Pneumatic Tires." Ralph F. Wolf, India Rubber World, Aug. 1, 1938, pp. 29-32, 45; Sept. 1, 1938, pp. 37-41.

Heads Rubber Research

Edgar Rhodes has been appointed senior rubber technologist of the British Rubber Producers Association. Dr. Rhodes was born in Yorkshire in 1900. He is a graduate of Leeds University: 1922, B.S., first class honors in chemistry, M.S., in chemistry, Ph.D., in botany after two years bio-chemical research in the botany department. For two years Dr. Rhodes was a demonstrator in plant physiology at the university. The following year was spent as a biochemist with the British Cotton Industry Research Association, Manchester.

Dr. Edgar Rhodes

Then Dr. Rhodes was appointed to the Rubber Research Institute of Malaya when it started in 1927. He served first as a botanist, then as pathologist. In 1929, however, he was transferred to the chemical division and has been its head for the last six years. He was responsible for the design and fitting out of the chemical and rubber testing laboratories and the rubber and latex factory in the recently opened new institute building. He is also the author of about 25 papers, mostly on latex and rubber chemistry and technology.

New Company

Filastic Waterproof Thread Co., Ltd., was recently formed with a capital of £10,000 in 10,000 ordinary shares of £1 each. The company is to acquire from Filastic, Ltd., an exclusive or limited license, or other concession to use patents relating to the combination of rubber with textiles, and to carry on the business of manufacturers of woven hair and cotton machine belting, canvas fire hose, etc. The following companies are interested in the new concern: R. & J. Dick, Ltd., Geo. Angus & Co., Ltd., Lewis & Tylor, Ltd., and Geo. Banham & Co., Ltd.

Imports and Exports

Crude rubber imports into the United Kingdom during the first half of 1938 more than doubled as compared with the corresponding period of 1937: 2,336,421 centals of 100 pounds, against 1,024,734 centals; at the same time reexports were 302,103 centals, against 695,914 centals.

Foreign business in manufactured rubber goods decreased. Exports of tires and tubes dropped markedly: outer covers from 2,613,668 units, value £1,755,085, in the first half of 1937 to 1,627,974 units, value £1,416,068, in 1938; and inner tubes, from 1,791,500 units, value £193,138, to 1,347,802 units, value £154,635. Whereas footwear exports at 28,664 dozen pairs, value £43,468, were practically on the same level as in 1937, a sharp increase in imports occurred: 616,879 dozen pairs, value £482,715, against 503,050 dozen pairs, value £478,023. Similarly exports of elastic cords, braids, webs, and fabrics fell from a value of £103,914 to £81,649, but imports rose from £49,780 to £60,442; exports of rubber sheets and sheeting dropped in value from £151,381 to £98,685; while imports increased

from a value of £13,470 to £19,455.

Among the other exports that declined, as compared with 1937, were rubberproofed apparel, which was £138,344, against £183,961; rubber and canvas belting, £151,578, against £178,294; rubberproofed cloth, £153,699, against £212,045; piping and tubing, £113,263, against £114,446; rubber insulated wires and cables, other than those for telegraph and telephone, £698,852, against £733,227. But exports of telegraph and telephone wires and cables (not submarine) rose from £407,338 to £478,240; while submarine telegraph and telephone cables increased from £52,426 to £130,749.

Progress of Rubber Technology

In the first annual report on the progress of rubber technology issued by the Institution of the Rubber Industry, Dr. W. J. Naunton, chief of the rubber laboratories, Imperial Chemical Industries, Ltd., reviews the work done on reclaiming scrap rubber and on substitutes. Reference is made to the processes by R. Fromm, J. Mau, and H. Voss, who suggest the use of phosphatides as the plasticizing agent; of Bemelmans, who heats old tires at temperatures high enough to carbonize the cotton; of the Rubber Institute of Japan, which claims that by washing ground scrap in alkali, mixing with tetraline, which is later recovered, and heating under high pressure, reclaim with superior properties is obtained.

Attention is called to F. Kirchhof's comprehensive article on rubber substitutes, which states that synthetic products would in time be found that would replace present rubber substitutes made from natural oils. Professor Kaufmann, of the University of Münster, and his pupils, working on the chemistry of rubber substitutes, have succeeded in clearing up the mechanism of factice formation. Kaufmann has for the first time produced valuable rubber substitutes—named by him Dithianacid Factice—directly from fatty acids. The chemistry of the process has been described by Kaufmann, Gindsberg, Rottig, and Salchow in a paper considered of special importance as, apart from its bearing on the production of factice, it probably represents the mechanism of rubber vulcanization itself. Mention is further made of the patent by K. W. Posnansky and C. Sandvoss, who produced pale-colored rubber substitutes, suitable for use in the production of cold- and hot-cured light-colored rubber goods, by hot sulphurization of vegetable oils with raw hydrogen polysulphides in the presence of chlorinated hydrocarbons, as tetrachlorethane.

Turning to synthetic rubber, Dr. Naunton touches on the various processes developed in different countries. He states further that there is little doubt that the quality of synthetic rubber depends to a large extent on the purity of the butadiene employed and mentions Russian work on purifying butadiene.

As to synthetic latices, the Germans have produced Buna latex, said to behave very similarly to natural latex; important advances have been made with Neoprene latex; the Russians produce synthetic latex by polymerization of butadiene in aqueous emulsion.

Much work has been done on reclaiming synthetic rubber, and it has been found that by using heat and a suitable softener, most vulcanized synthetic rubbers can be replasticized.

GERMANY

Pahl Celebration

On August 1, 1938, the Dortmunder Gummiwaren Fabrik Wilhelm Pahl, K.G., Dortmund, celebrated both its seventy-fifth birthday and the fiftieth anniversary of its chief's connection with the firm. The concern, established in 1863 by Karl Gottlob Pahl, father of the present head, Wilhelm Pahl, from the outset specialized in the manufacture of mechanical rubber goods. When Wilhelm Pahl entered the firm on August 1, 1888, after the death of his father, he began to put manufacturing on a mechanical and scientific basis. For this his training had prepared him; he had attended the universities of Zurich, Karlsruhe, and Charlottenburg and in conjunction with Dr. Chr. Heinzerling had written a thesis in which it was sought for the first time to determine the effect of an ingredient on the mechanical, chemical, and electrical properties as well as on the thermal behavior of vulcanized rubber. He had also visited Russia and America, where the rubber industry already was flourishing.

Taking over the firm in 1893 on the death of his mother, he was able to expand manufacture, particularly the large-scale production of rubber conveyer belts. In 1909 he visited the Far Eastern rubber plantations and, while there, developed a method of separating rubber from latex by means of carbonic acid, a process patented in all civilized countries.

During the World War the firm continued its activities despite various obstacles, but difficulties increased after the war owing to inflation and the French occupation of the Ruhr territory so that the firm even had to close for a time. After stabilization of the mark, however, matters improved, and production increased steadily, especially of conveyer belts.

Herr Pahl, in addition to his untiring efforts in behalf of his firm, has also been town councillor for 16 years, 15 of which he served as member of the finance commission; and he has for 25 years acted as judge and advisor at the Commercial Court.

Use of Substitutes

At the national convention of the Chemical Trade Bureau, Mannheim, June 24, Dr. Fritz Konecke, president of the board of the Continental Gummiwerke A.G., gave a lecture, which apart from its interest as an exposition of what Germany today expects of its heads of industry, deserves attention for the insight it gives into the progress made in the German rubber industry in utilizing domestic substitutes. It appears from this that numerous mechanical articles are now made from Buna 85, 115, and N, and that hundreds of tires are produced daily, composed of natural rubber and a high percentage of Buna or of Buna entirely. The German rubber industry, Dr. Konecke said, has lately joined financial and technical forces with the I. G. Farbenfabrik, and with government aid will build the third Buna factory.

Since 1933-34 Continental has been working on the problem of substituting German produced fibers for imported cotton for tires. The results of tests in America in 1936 led the directors to the conclusion that it is the artificial silk itself that must be improved, and Continental has interested both the I. G. Farben and the Glanzstoff concerns in the development of a new superior artificial silk for technical purposes with high tensile and comparatively low elongation. German rubber manufacturers are said to have progressed so far in solving the problem of achieving rubber bonding between rubber and artificial silk that rayon tires are now claimed to attain the efficiency of cotton tires readily. The goal is to produce rayon tires having greater resistance than cotton under severe strain.

Although Germany has few, if any, sources of natural gas for the production of active carbon black, German black has been produced which is claimed to equal, if not excel, the foreign product, and it is expected that in the near future Germany will be independent of foreign imports of blacks.

Although considerable progress has been made in the production of domestic materials for the rubber industry, the greatest strides are said to have been made in reclaimed rubber. Since 1933 the consumption of reclaim in Germany has increased ten-fold. Efforts will be directed toward reclaiming Buna.

Convention of Chemists

A large number of German and foreign chemists attended the national convention of German Chemists, Bayreuth, June 7 to 11. On the last day papers were read on plastics, including "Importance and Status of Analysis of Plastics," Werner Esch; "Chemical Analysis of Organic Basic Materials for Plastics and Varnishes," G. Bandel; "Physical-Chemical Research in the Field of Plastics," E. Jenckel; "Investigations of Aqueous Solutions of High

(*Continued on page* 64)

Rubber Industry in Far East

MALAYA

Second Restriction Period

With the second restriction period due, it is natural that the International Rubber Regulation Committee should come in for a special share of advice and criticism, especially on the subject of speedy adjustment to changing levels of demand. It is felt that better working of restriction may now be expected after the years of experience the committee has had so that sharp price fluctuations will not recur.

In a letter to a London paper General Sir Henry Livingston presents a different, though not a new, point of view. He feels that the coming restriction period should be used for the reorganization of the plantation rubber industry. Too many estates with capitalization of £50 to £110 an acre for 30-year-old rubber, he finds, are protesting that it now costs under £30 to bring an acre of up-to-date seedlings, capable of yielding 1,000 pounds an acre and more, to maturity.

General Livingston would have the governments of Malaya and Ceylon and the council of the Rubber Growers' Association cooperate; surplus directors paid off and removed; widespread amalgamation of companies which should pool their resources and devote them to replanting all Eastern rubber lands on the most modern and scientific basis. Most of the 600 rubber-growing companies with headquarters in London would otherwise not be financially able to carry out replanting on a large scale, he fears.

If no drastic rationalization of control, finance, and management takes place in the next year, rubber growing will forever be subject to restriction schemes or become an Asiatic smallholders' industry.

It is several years since the Rubber Growers Association presented a well-considered, but quite unsensational scheme for saving the industry based on systematic amalgamation of estates. But the industry would have none of it then; is it more ready to take General Livingston's advice to heart today?

Company Reports

Recently issued company reports, although referring to the results of 1937, are colored by the pessimism engendered by the drop in prices which started during the second half of 1937 and up to the time the annual meetings took place had not yet begun to improve.

Earnings and Production Costs

An analysis of the reports of 15 Malayan companies taken at random shows that all of them were able to pay dividends during 1937, the average being around 10%; one company turned out only 5%, but to offset this, another paid 20%. The latter company reported that earnings for the year had been the highest since 1927. (It is now generally recognized that 1937 should be set down as one of the prosperous rubber years.) In view of declining prices in the latter half of last year most estates adopted a cautious financial policy; what with the sharp cut in the quota, expectations for the current year are keyed low.

Last year the increase in wage rates and other expenditures raised costs of production per pound as compared with 1936, but better prices and larger crops more than offset this rise. But now, although wages have been cut, the low permissible exports and the low price will have an adverse effect on costs and profits. Some estates have been fortunate enough to sell forward part of their 1938 crop at prices ranging from 9.5d. to 11½d. per pound. But those unable to do likewise will need their 1937 profits.

Replanting and Long-lived Old Rubber

Most of the companies have done a certain amount of replanting. Some have been consistently following a replanting program for years; a few recently started replanting small areas as an experiment and to obtain necessary experience against the time when replanting on a larger scale should be decided on. A few estates prefer to manure old rubber partly because it is still too good to cut out and partly because it is considered that with the smaller crops now required it is more profitable to allow these areas to rest and give them a chance thereby to increase their yield power.

Kepong Malay Rubber Esyayes, Ltd., decided that as it had been found that the economic life of old rubber did not go much beyond 30 years at present, replanting to replace old wornout stock was necessary. About 520 acres of old rubber had already been replanted, and a balance of over 300 acres is to be taken in hand this year.

But at the meeting of Malaysia Rubber Co., Ltd., the chairman said its old rubber in general has been and still is too productive to undertake general replanting; the company preferred to plant up its jungle area. The old rubber on Cheviot and Labu estates are in as favorable a condition. J. G. Hay, who recently visited these estates, said at the annual meeting of Cheviot Rubber Estates, Ltd.:

"The features which continue to distinguish your properties from those of the average rubber company are mainly two. First, they are lasting properties . . . and secondly, output per acre all over is high. On Labu . . . you have rubber 40 years old and a not inconsiderable area over 30 years old; while on Cheviot . . . you have areas of considerable extent which are at least 30 years of age.

"Now in ordinary circumstances you would be presented today with the problem of replacement, but I am bound to say that when I visited—and I visited with my mind full of this question of replacement of deteriorated areas—I found that whatever may be the theory, in actual fact there was little need for replacement yet on either of those two properties . . . I saw no evidence that . . . outputs were declining; on the contrary, as your younger estates get older, the output per acre should improve."

However to be prepared for the eventual need of replanting some years hence, small experimental areas of the worst rubber are to be replanted to gain experience.

A few other estates in Malaya, because of favorable conditions of soil and early exploitation, continue to give satisfactory and even excellent yields over a long period of years. It is the longevity of estates like these which continually forces revision of the estimated age limit beyond which plantation rubber ceases to pay.

Of the 15 estates reviewed only two appear to have mature budded rubber, but this is not being tapped yet—at least not on a commercial scale. The rubber planting industry should soon have available a fund of valuable information on the advantages or otherwise of replanting old rubber and on yields of budgrafts under commercial exploitation.

JAPAN

Synthetic Rubber Progress

The following translated statement concerning the progress of synthetic rubber manufacture in Japan was published by the Nippon Kogyo Shimbun, an Osaka daily industrial newspaper, on May 23, 1938, and has been forwarded by the American Trade Commissioner, at Tokyo:

"The synthetic rubber production schemes in this country have been ris-

ing in rapid succession on the strength of the concrete Government encouragement of substitute industries under the emergency situation. The industry has apparently developed to a stage where the production on industrial scale has become possible. So far, some 12 industrial concerns and four experimental stations have undertaken the experiments relative to the industrialization of synthetic rubber production.

"Those laboratories and companies are adopting one of the following processes: namely, the butadiene process, the chloroprene process, or the sulphuration process, or a combination of two of the three processes.

"The Umeno Laboratory has made the biggest progress in the experiment and is making hasty preparations to start a daily production of 5 metric tons of synthetic rubber in cooperation with the Japan Rubber Co. The Osaka Industrial Experimental Station, reportedly, also has succeeded in the intermediate-industrialization experiment. Under the circumstances, it is believed likely that synthetic rubber will be commercialized within a few years."

In connection with the work of the Osaka Industrial Experimental Station we learn from another source that here the base for synthetic rubber is carbide, of which Japan has inexhaustible supplies. It is further reported that this synthetic rubber has greater durability and elasticity as well as better electrical properties than natural rubber. It is also claimed that costs of production are far below those in Germany, the United States, and Soviet Russia, although they are still somewhat higher than those of natural rubber. However it is expected that mass production will lower the prices to such an extent that the synthetic rubber will be cheaper than the natural material.

The Mitsubishi Mining Co. is said to be planning the production of this rubber on a commercial basis.

No one has yet claimed the 10,000-yen prize offered by the Imperial Invention Society for the individual or company that turns out a good synthetic rubber.

Government Control

The Japanese government is extending its control over industry, and various new orders regulating price, imports and sale of a wide range of goods, including rubber goods and industrial chemicals, have recently gone into effect. On July 9, 1938, six new ordinances were promulgated providing among the rest for the control of the selling price of commodities including rubber products, carbon black, zinc oxide; state management of the rubber supply and the limitation of the use of rubber; control of the sale of rubber boots; control of the distribution of rubber. These ordinances went into effect on July 9.

NETHERLAND INDIA

Manufacturing in Java

As to the manufacture of rubber goods, the most important enterprise, of course, is that of Goodyear, which has extended its daily capacity to 600 each of automobile tires and tubes, 7,500 cycle tires and 6,800 tubes, besides 800 meters of solid tiring for baby carriages and the like, hitherto imported.

Tire exports fell sharply in the first nine months of 1937 when the average per month was only about 7.2 tons; but a marked improvement occurred in the last three months to an average of 27 tons monthly. The total tire exports for the year came to 148 tons against 257 tons in 1936.

Owing chiefly to Goodyear, local consumption of rubber increased from 1,285 tons in 1936 to 2,043 tons in 1937. For the same reason tire imports have shown a steady decline in the last few years, as follows:

TIRE IMPORTS INTO NETHERLAND INDIA

	1935	1936	1937
Automobile tires .....*No.*	114,000	62,000	53,000
Automobile tubes...	82,000	27,000	14,000
Cycle tires	3,269,000	1,919,000	1,412,000
Cycle tubes	2,280,000	1,534,000	1,454,000
Total	5,745,000	3,542,000	2,933,000

Besides Goodyear, there are a few smaller factories in Soerabaia and Bandoeng where other rubber goods are made; while the I.M.I.W. produces goods from latex. A gas mask factory will soon be erected at Bandoeng.

Planted Acreage

In 1937, Netherland India exported the record total of 438,600 tons of rubber, against 314,595 tons the year before. Of this, estates sent 243,477 tons, against 159,481 tons in 1936. With increasing production there was naturally a corresponding drop in the untapped mature area; in 1937 this was only 12.7%, against 26.8% in 1936, or 68,024 against 142,234 hectares. The young tappable area which had never been tapped before decreased from 59,179 to 23,243 hectares.

According to the Netherland India Association for the Rubber Trade, Batavia, the planted acreage of estates at the end of 1937 may be divided roughly as follows:

	Hectares	Hectares
In production	.....	443,000
Tapping stopped	68,000	.....
Tappable, but never tapped.....	23,000	.....
Immediately tappable reserves..		91,000
Total tappable area.....		534,000
Future reserves (immature area).....		62,000
Total area estate rubber.....		596,000

Extension of this area by 5%, as permitted under the proposed new restriction agreement, would thus give Netherland India an additional 30,000 hectares.

Errors in Tree Census

Numerous errors have been found in the native rubber figures for the tree census and calculated acreages so that many corrections had to be made. Thus no fewer than 7,000 corrections appeared for Palembang alone. The errors seem due to the fact that the natives, suspicious of the purpose of the census and fearing further taxation, for the most part reported lower acreages or failed to mention the existence of gardens. But when they discovered that by doing so they stood to lose, they soon put in claims for correction, and the distribution of the quota among the various disricts had to be revised.

Much remilling activity occurred during the year, and several new factories were opened. In Java, where the total area of native rubber is only 15,048 hectares, with 7,956,000 trees, of which 4,839,000 are tappable, the Department of Economic Affairs has assisted in the erection of 12 small cooperative factories for preparing rubber.

June Exports

According to the Central Bureau of Statistics, estate rubber exports in June totaled 12,878 tons, against 23,242 tons in June, 1937. Of the 1938 amount, Java and Madura shipped 4,621 tons, and the estates in the Outer Provinces 8,257 tons. Native rubber exports came to 11,941 tons, against 24,647 tons last year. June, 1937, exports were the highest for that year.

Export Taxes Lower

The Director of Finances has fixed the export duty on rubber for 1939 at 1.9 guilder cents per half kilo against the prevailing 2.9 cents per half kilo. The Defence Export duty has been reduced from 0.33 guilder cents per half kilo to 0.265 cents.

Germany

(*Continued from page* 62)

Molecular Acids and Their Salts," W. Kern; "Some Non-Thermoplastic Materials from Cellulose," K. Sponsel; "Comparative Investigations on Cellulose-Triacetate Foil and Threads," K. Werner; "The Kinetics of Chain-Polymerizations," G. V. Schulz; "Combination Polymerizates," H. Hopff; "Emulsion Polymerizations and Technical Evaluation," H. Fickentscher; "The Production of Electro-Insulation Foil from Plastics," Hagedorn; "Results with Varnishes for Wire Insulation Based on Artificial Resins," P. Nowak; "Fillers for Resins and Molding Materials," W. Rohrs.

Editor's Book Table

NEW PUBLICATIONS

"Camachine 40-3L for Straight and Bias Binding." Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y. 4 pages. According to this folder, Camachine 40-3L has distinct advantages in producing straight or bias bindings as used by manufacturers of underwear, corsets, garments, etc. Score-cut slitting, used in this machine, is accomplished by steel slitter wheels which press, rather than cut, the web apart against the hardened steel surface of a cutter backing roller.

"Restoring Management Control of Wages and Hours." By Allen W. Rucker, National Metal Trades Association, Chicago, Ill. 24 pages. This booklet is a reprint of an address delivered by Mr. Rucker at the fortieth annual convention of the National Metal Trades Association on May 26, 1938. Mr. Rucker states that before it can expect to resume control of wages and hours, management must first make plain that its past control over wages and total payroll has not been arbitrary. What is wanted, he continues, to restore flexibility to rigid wages and hours is an understandable principle for compensating labor as a group according to its economic worth, just as the differential wage rate compensates individuals according to their worth. As a basis for the principle of group compensation, Mr. Rucker offers the following dictum: That throughout the present century group compensation of factory labor has been almost constantly proportionate to total marketable productive values. It is graphically shown that, year by year, the value of output and of the man-year wage has remained almost constant. It is also shown that, despite continuously rising wage rates, compensation of labor as a group was almost uniformly proportionate to marketable output year after year.

"Tag Indicating, Recording and Controlling Instruments for Temperature and Pressure." C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y. 64 pages. In addition to presenting the company's new line of recording thermometers and pressure gages, this catalog, 1060 D, covers indicating and recording controllers, designated as either the "On-Off" model for ordinary control work or the Throttling model for use where considerable apparatus lag occurs. Illustrations showing the operation and practical application of these instruments are included.

"The Vanderbilt News." Vol. 8, No. 4. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 30 pages. The July-August issue of this house organ features a review of the compounding properties and advantages of Thermax, thermatomic carbon, for the loading of dark colored rubber goods. Data given show the effects, as reflected by the physical properties, of increasing loadings of Thermax in pure gum and reclaimed rubber compounds. Another article outlines the outstanding properties of Altax as an accelerator for reducing scorching and overcuring to a minimum. The beneficial properties of Reogen as a plasticizer, dispersing agent, and anti-scorching agent are discussed and supported by experimental evidence. Plasticity determinations were made on a tubing machine plastometer which measures the tubing speed of the stock in grams extruded per minute. The issue is concluded with a presentation of experimental data showing the compression set of two different Tuads compounds and a map which shows the location of the Vanderbilt laboratory in East Norwalk, Conn.

"Rubber: Some Facts on Its History, Production, and Manufacture." By P. W. Barker, Leather and Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C. 36 pages. Because of the numerous requests received by the Leather and Rubber Division for general information on the production of rubber and the manufacture of rubber products, the division has prepared this pamphlet which briefly presents a comprehensive picture of the subject. In addition to the sections on production and manufacture, there is information on the history of rubber, government control, reclaim, synthetic rubber, and statistics. The booklet is concluded with diagrammatic illustrations of a rubber tree. Copies of the pamphlet are priced at 5¢ each.

"Lucky Strike Plumbing Rubber Specialties and All Allied Products." Lavelle Rubber Co., 424 N. Wood St., Chicago, Ill. 36 pages. This illustrated catalog and price list, H-38, is devoted exclusively to the firm's line of plumbers' rubber specialties and allied products. Each product is illustrated, and a brief description is followed by tabular data as to: trade size or number, number of items to a standard package, package weight, and list price. An index permits quick reference to the numerous products.

"News about du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. A news letter, dated July 18, contains a 28-page report on coated fabric compounding with rubber and Neoprene. The report discusses the various methods of curing rubberized fabrics and suggests a number of compounds with physical test data.

"Automobile Facts and Figures." 1938 Edition. Automobile Manufacturers Association, Inc., 366 Madison Ave., New York, N. Y. 96 pages. This annual compilation of data covers the pertinent facts of the automobile industry for 1937. Authoritative and extensive in scope, this reference work includes numerous statistical tables and charts relating to the production and use of automobiles, their registration, taxes, etc. Notable facts connected with the automobile during 1937 were: transportation of persons and goods over the highways of the nation surpassed all previous years; retail sales of both trucks and busses exceeded the peak year of 1936; while passenger car sales to consumers were second only to 1929; registrations of passenger cars, trucks, and busses all marked up a new high score both in the United States and in the world; employment in automobile and parts manufacturing plants topped 1929 by 16%; while aggregate payrolls in these plants boosted the 1929 peak by 10%; the record level of gasoline consumption in 1937 reflects unprecedented use of motor vehicles; taxes on motor vehicle owners went to a new high for the seventeenth consecutive year and amounted to $1,584,990,000.

"Schedule of Rubber Goods Manufactured by Società Italiana Pirelli ("C" Dept.) Milan." Società Italiana Pirelli, Milan, Italy. 32 pages. This catalog lists a wide range of the rubber articles manufactured by the firm and is intended to assist customers in the search of required articles and to illustrate the diversification of the company's production. The classification of products and the number of items listed under each classification follow: surgical, sanitary and toilet articles—74; mechanical goods—268; articles of protection and accessories—41; Gommapiuma (latex sponge)—70; articles for sports and games—47; articles for domestic use, building trade, etc.—49; mackintoshes, etc.—19; articles for offices, stationers, and the printing trade—29; sundry articles—35.

(*Continued on page 76*)

BOOK REVIEWS

"Annual Report on the Progress of Rubber Technology." Vol. I. 1937. Published by The Institution of the Rubber Industry, 12 Whitehall, London, S.W.1, England. Paper, 7¼ by 9¾ inches, 153 pages. Subject and author indexes. Price: to non-members of I.R.I., 10s. 6d.; to members of I.R.I., 5s.

This is the first of a series of annual reports on the progress of rubber technology throughout the world, giving a synopsis of the principal scientific and technical advancements in the various branches of the rubber industry during 1937. These reports are intended to afford rubber scientists, technicians, and manufacturers with an easily accessible source of information on the latest developments in every phase of the industry. An annual comprehensive treatise of this type should provide the rubber industry with a definite and valuable service.

Volume I comprises 24 chapters, each under separate authorship, and covers the following subjects: history and statistics; planting and production of raw rubber and latex; properties, applications, and utilization of latex; chemistry and physics of raw rubber; synthetic rubber; testing equipment; compounding ingredients; fabrics and textiles; chemical and physical properties of vulcanized rubber; tires; belting; hose and tubing; cables and electrical insulation; footwear; games, sports accessories, and toys; mechanical rubber goods; roads; rubber flooring; surgical goods; textile-rubber composites; solvents and cements; sponge rubber; hard rubber; works processes and materials; and machinery and appliances.

The intensive nature of the book is indicated by the fact that there are 1,113 references to patents, periodicals, etc. in the volume's 153 pages; the references are listed at the end of their respective chapters. An adequate subject and name index at the end of the volume provides for ready reference.

"Industrial Price Policies and Economic Progress." Edwin G. Nourse and Horace B. Drury. Published by The Brookings Institution, Washington, D. C. 1938. Cloth, 5¾ by 8 inches, 328 pages. Index. Price $2.50.

This book, a follow-up on the four-volume survey of the distribution of wealth and income in relation to economic progress published by the Brookings Institution, describes in concrete realistic terms the factors which enter into the making of practical industrial prices under modern conditions. One of the conclusions arrived at in the above-mentioned survey was that the broadest and most direct road to the improvement of the general economic welfare is to be found through a consistent policy of expanding real incomes by lowering the prices of goods and services wherever advance in techniques and organization make such a course practicable. The present study is not directly concerned with the present depression or with depression causes or cures; its analysis of price policies is concerned with economic hygiene rather than emergency treatment of acute illness. The subject matter of the volume falls into three divisions: the first two chapters present general statistical material relating to the subject under discussion; the second group of five chapters describes and analyzes various ways in which reduction in real price has been effected in many parts of the industrial field in recent decades, and factors both within and outside the given company which condition and complicate the price-maker's decision; Chapters 8 to 11 of the book emphasize the organizational factor and the various ways in which the specialized executive function may be exercised through price policy to determine the course of modern industry.

At the end are five appendixes: Appendix A discusses the ramifications and shortcomings of price data; Appendix B consists of tabular indexes of wages, prices, and income; Appendix C lists industrial consolidations, 1898-1902, with capital of five millions or over; Appendix D presents four specific cases and discusses the relation of cost to volume of sales and profit; Appendix E is an excerpt from *Fortune* which discusses price policies in the steel industry.

RUBBER BIBLIOGRAPHY

CAMELBACK TESTS. What Do They Really Mean? V. L. Smithers, *Tire Rebuilders News,* July, 1938, pp. 8-11, 31.

RECLAMATION OF SCRAP RUBBER AND SUBSTITUTES. W. J. S. Naunton, *India Rubber J.,* July 23, 1938, pp. 4-5.

MODERN RUBBER CALENDERING. H. C. Young, *Rubber Age (London),* Aug., 1938, pp. 158-62.

ADVANCED INSTRUMENTS FOR RUBBER INVESTIGATIONS. H. J. Hornby, *Rubber Age (London),* Aug., 1938, pp. 166-67.

THIOKOL. *Rubber Age (London),* Aug., 1938, pp. 168-69.

LATEX IN THE RUBBER INDUSTRY. V. H. J. Stern, *Rubber Age (London),* Aug., 1938, pp. 173-75.

RUBBER-INSULATED STATION CORDS. H. H. Staebner, *Bell Lab. Record,* Aug., 1938, pp. 396-99.

NATURAL AND ARTIFICIAL RUBBER: Elasticity of Long-Chain Molecules. H. Mark, *Nature,* 141, 670-72 (1938).

STRUCTURE OF STRETCHED RUBBER. C. J. B. Clews and F. Schoszerger, *Proc. Roy. Soc., A,* 164, 491-96 (1938).

RUBBER IN FACTORY PLANT. E. W. Mulcahy, *Auto. Eng.,* 28, 177-79 (1938).

M.-P. CURVE OF CAOUTCHOUC AND GUTTA PERCHA. K. H. Meyer, *Naturwiss.,* 26, 199-200 (1938).

GOUGH-JOULE EFFECT AFTER VULCANIZATION. S. Gleichentheil and W. Neumann, *Österr. Chem.-Ztg.,* 41, 199 (1938).

PRESERVATION OF INSULATION RUBBER ON ELECTRIC WIRES AND CABLES. J. C. Bongrand, *Compt. rend. XVII Cong. Chim. Ind.,* 1109-14 (1937).

BUTADIENE RUBBER. Y. Mayor, *Rev. gén. mat. plastiques,* 13, 275-78, 305-07 (1937).

EVALUATION OF CREASE-RESISTANT FINISHES FOR FABRICS. H. F. Schiefer, *J. Res. Nat. Bur. Stand.,* 20, 241-52 (1938).

LARGE MOLECULES IN SYNTHETIC ORGANIC CHEMISTRY. G. O. Curme, Jr., *J. Franklin Inst.,* Aug., 1938, pp. 187-202.

CHEMICAL FERTILIZING OF MATURE RUBBER TREES. C. F. Flint, *India Rubber J.,* 95, 19-23 (1938).

DEVELOPMENTS IN COLONIAL DEPENDENCIES. *Bull. Rubber Growers' Assocn.,* July, 1938, pp. 281-85.

LATEX AS A BEVERAGE. *India Rubber J.,* Aug. 6, 1938, p. 169.

SOME PROPERTIES OF RUBBER LATEX. E. Schmidt and P. Stamberger, *Rubber Chem. Tech.,* July, 1938, pp. 445-58.

AZO DYES DERIVED FROM RUBBER. R. Low, *Rubber Chem. Tech.,* July, 1938, pp. 515-22.

STUDIES OF ORGANIC ACCELERATORS. XVI. Part 4. Detection and Analysis of Organic Accelerators. Detection of Guanidine Accelerators in Vulcanized Rubber. XVIII. Part 6. Detection of Dithiocarbamate Accelerators in Vulcanized Rubber. XIX. Part 7. Detection of Thiuram Accelerators in Vulcanized Rubber. K. Shimada, *Rubber Chem. Tech.,* July, 1938, pp. 531-37.

DIFFICULTIES IN THE THOROUGH IMPREGNATION OF TEXTILES WITH LATEX. J.-Ch. Bongrand, *Rubber Chem. Tech.,* July, 1938, pp. 538-44.

THE DEPOSITION OF RUBBER ON TO TEXTILE FIBERS. C. M. Blow, *Rubber Chem. Tech.,* July, 1938, pp. 545-57.

SOME APPLICATIONS OF HIGH-FREQUENCY ELECTRIC CURRENTS TO THE LATEX INDUSTRY. H. Leduc, *Rubber Chem. Tech.,* July, 1938, pp. 570-74.

PROCESSING CHARACTERISTICS OF RUBBER COMPOUNDS. A. H. Nellen and C. E. Barnett, *Rubber Chem. Tech.,* July, 1938, pp. 585-90.

CONTROL TESTS OF UNIFORMITY IN THE MANUFACTURE OF CARBON BLACK. H. W. Grote, *Rubber Chem. Tech.,* July, 1938, pp. 598-600.

OXYGEN PRESSURE AGING. Improved Equipment. L. M. Freeman, *Ind. Eng. Chem. (Anal. Ed.),* Aug. 15, 1938, pp. 428-31.

NEW INKS FROM RUBBER. R. A. Crawford and D. B. Forman, *Rubber Age (N. Y.),* Aug., 1938, pp. 281-84.

OXIDATION PRODUCTS OF RUBBER: RUBBONE. H. P. Stevens and F. J. Popham, *Rubber Age (N. Y.),* Aug., 1938, pp. 285-88.

CHARLES GOODYEAR. P. W. Barker, *Rubber Age (N. Y.),* Aug., 1938, pp. 294-96. (To be continued.)

SOLVENTS AND PLASTICIZERS. 1918-1938. C. Ellis, *Chem. Ind.,* Aug., 1938, pp. 145-47, 149, 151-52.

NEW CHEMICALS FOR INDUSTRY. *Chem. Ind.,* Aug., 1938, pp. 167-69.

Patents and Trade Marks

MACHINERY

United States

2,124,111. **Curing Rim.** J. C. Heintz, Lakewood, O.

2,124,613. **Apparatus to Remove Articles from Molds.** A. E. Erickson, Milwaukee, Wis., assignor to United States Rubber Products, Inc., New York, N. Y.

2,124,636. **Rubber Thread Apparatus.** H. Schüller, E. Matzner, and A. Kailich, all of Vienna, Austria, assignors to United States Rubber Products, Inc., New York, N. Y.

2,124,731. **Golf Ball Tester.** W. W. Cranford and G. I. Butler, both of La Grange, Ill.

2,124,836. **Tire Tool.** G. W. Teter, Fairplay, Colo.

2,125,034. **Apparatus to Form Rubber Thread.** T. L. Shepherd, London, England.

2,125,592. **Rubber Article Form.** A. N. Spanel, Rochester, N. Y.

2,126,271. **Tension Equalizer.** T. M. Moran, Montreal, P. Q., Canada, assignor to United States Rubber Products, Inc., New York, N. Y.

2,126,434. **Glove Tester.** K. S. Vosbury, Binghamton, N. Y.

Dominion of Canada

375,240. **Heel Mold.** C. and F. Hall, co-inventors, Mexico City, Mexico.

375,276 and 375,277. **Form for Rubber Garments.** A. N. Spanel, Rochester, N. Y., U. S. A.

375,409. **Tire Attacher and Detacher.** C. Dautner, Waterloo, Ont.

375,500. **Rubber Thread Apparatus.** Industrial Rayon Corp., Cleveland, assignee of C. E. Herrstrom, Lakewood, and F. J. Samerdyke, Rocky River, co-inventors, all in O., U. S. A.

375,514. **Vulcanizing Press.** Ohio Rubber Co., assignee of E. M. Winegar, both of Willoughby, O., U. S. A.

375,538. **Belt Curing Apparatus.** Wingfoot Corp., Wilmington, Del., assignee of W. H. Leavenworth, Akron, O., both in the U. S. A.

United Kingdom

481,589. **Rubber Thread Apparatus.** R. and J. Pickles.

482,373. **Physical Qualities Tester.** Dunlop Rubber Co., Ltd., E. Simpson, A. J. Stubbs, and T. Norcross.

482,844. **Coating Machines.** F. F. Schwartz and M. A. Chavannes.

483,017. **Tire Tread Slitter.** Dunlop Rubber Co., Ltd., H. Willshaw, and M. Turner.

484,007. **Coating Apparatus.** Tufide Products Corp.

Germany

662,191. **Device to Produce Rubber Strainers.** R. Haas, Berlin-Zehlendorf.

662,415. **Device to Make Rubber Toys.** Hungarian Rubber Works, Budapest, Hungary. Represented by J. Reitstotter, Berlin.

PROCESS

United States

2,124,637. **Caoutchouc Threads.** H. Schüller, E. Matzner, and A. Kailich, all of Vienna, Austria, assignors to United States Rubber Products, Inc., New York, N. Y.

2,124,854. **Hollow Rubber Articles.** R. H. Guinzburg, Flushing, assignor to I. B. Kleinert Rubber Co., New York, both in N. Y.

2,124,993. **Wire or Cable.** E. D. Youmans, Clifton, assignor to Okonite Co., Passaic, both in N. J.

2,125,001. **Rubber Tubing.** R. R. Cowen and C. L. Silvia, assignors to New Jersey Rubber Co., Taunton, Mass.

2,125,495. **Garment Protectors.** E. M. French, Garden City, assignor to Rand Rubber Co., Inc., Brooklyn, both in N. Y.

2,125,633. **Tire Cord.** P. E. Harrison, Dover, N. H.

2,126,220. **Inflatable Ball.** M. Scudder, assignor to Rawlings Mfg. Co., both of St. Louis, Mo.

2,126,273 and 2,126,275. **Sponge Rubber.** S. R. Ogilby, Staten Island, assignor to United States Rubber Products, Inc., New York, both in N. Y.

2,126,277. **Solvents.** F. N. Pickett, London, England, assignor to United States Rubber Products, Inc., New York, N. Y.

2,126,672. **Separating Fiber from Rubber.** C. H. Smith, Tallmadge, R. W. Moorhouse, Fairlawn, and J. J. Hartz, Akron, all in O., assignors to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

375,078. **Perforated Rubber Sheeting.** E. Lumsden, assignee of F. C. Jones, both of London, England.

375,105. **Book Binding Headband.** J. MacLaurin, Ware, Mass., U. S. A.

375,275. **Latex Sheeting.** A. N. Spanel, Rochester, N. Y., U. S. A.

375,490. **Mounting for Absorbing Vibrations.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. C. Keys, Detroit, Mich., U. S. A.

375,491. **Storage Battery Plate.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. A. Gibbons, Montclair, N. J., and E. Hazell, New York, N. Y., co-inventors, both in the U. S. A.

United Kingdom

481,327. **Attaching Rubber to Other Surfaces.** Guy & Murton, Inc.

481,396. **Attaching Synthetic Rubber to Non-Rubber Surfaces.** Metallges. A.G.

481,627. **Molding Gas Masks.** P. Stock.

481,823. **Bandage Compositions.** F. A. S. Gwatkin (H. V. Lucas).

481,861. **Rubber Thread.** R. F. McKay (International Latex Processes, Ltd.).

481,871. **Porous Rubber.** C. E. Every-Clayton (Soc. de Progres Technique).

482,393. **Dipping Process.** R. F. McKay (Magyar Ruggyantaarugyar R. T.).

482,575. **Coated Fabrics.** Minnesota Mining & Mfg. Co.

482,622. **Filters.** Fairey Aviation Co., Ltd., and A. G. Forsyth.

482,679. **Coated Fabrics.** F.F. Schwartz and M. A. Chavannes.

482,693. **Molding Rubber Covers on Wheel Teeth.** M. Goldschmidt.

482.767. **Coated Fabrics.** F. F. Schwartz and M. A. Chavannes.

482,833. **Bituminous and Rubber Compositions.** W. Gebhardt.

482,908. **Cables.** Callender's Cable & Construction Co., Ltd., and L. Hart.

483,381. **Sacks.** J. Carlin.

483,393. **Coated Fabrics.** J. Carlin.

483,534. **Tire Fabrics.** Cela Holding Soc. Anon.

483,535. **Endless Belts.** Cela Holding Soc. Anon.

483,589. **Conduits.** H. D. T. Waldram.

483,713. **Cables.** Callender's Cable & Construction Co., Ltd., and L. Hart.

483,714. **Cables.** H. Young and F. Nicholson.

483,977. **Golf Ball.** R. M. Goepp, Jr., and J. T. Power.

484,556. **Pneumatic Toys.** Hungarian Rubber Goods Factory, Ltd.

Germany

662,763. **Treating Surfaces of Rubber Goods.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., St. Peter's Port, Channel Islands. Represented by C. and E. Wiegand, both of Berlin.

662,925. **Articles of Rubber and Organic Fibers.** Dewey & Almy Chemical Co., Cambridge, Mass., U. S. A. Represented by G. Lotterhos, Frankfurt a.M.

663,027. **Objects from Aqueous Rubber Dispersions.** International Latex Processes, Ltd., St. Peter's Port, Channel Islands. Represented by R. and M. M. Wirth, C. Weihe, and W. Schalk, all of Frankfurt a.M., and P. Wirth, Berlin.

663,330. **Molding Bewigged Dolls' Heads.** Rheinische Gummi-und Celluloid-Fabrik, Mannheim-Neckarau.

CHEMICAL

United States

2,125,562. **Chewing Gum Base.** G. A. Hatherell, Roscoe, assignor to F. A. Garbutt, Los Angeles, both in Calif.

2,126,019. **Plasticizer.** A. Kirkpatrick, assignor to Monsanto Chemical Co., both of St. Louis, Mo.

2,126,268. **Latex Preservative.** J. McGavack, Leonia, N. J., assignor to United States Rubber Products, Inc., New York, N. Y.

2,126,269. **Vulcanized Rubber Product.** W. E. Messer, Cheshire, Conn., assignor to United States Rubber Products, Inc., New York, N. Y.

2,126,620. **Vulcanizing Agent.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,126,670. **Accelerator.** W. Scott, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

375,023. **Leather Substitute.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. Morgan, Drexel Hill, Pa., U. S. A.

375,464. **Vulcanizing Agent.** Wingfoot Corp., Wilmington, Del., assignee of H. I. Cramer, Cuyahoga Falls, O., both in the U. S. A.

United Kingdom

481,523. **Rubber Solutions.** E. I. du Pont de Nemours & Co., Inc.

481,606. **Corrosion Preventive.** Winn & Coales, Ltd., and F. B. Coales.

481,620. **Rubber Cement.** A. E. Bond.

482,198. **Coloring Rubber and Artificial Horn.** W. W. Groves (I. G. Farbenindustrie A.G.).

482,259. **Decks.** H. S. Rowan and Rowan & Boden, Ltd.

482,335. **Rubber Threads.** R. P. Roberts and R. M. Dingley.

482,677. **Rubber Compositions.** J. Duarry-Serra.

482,858. **Porous Rubber.** International Latex Processes, Ltd.

483,006. **Rubber Compositions.** F. Rostler and V. Mehner.

483,399. **Urea-Aldehyde Condensation Products.** E. I. du Pont de Nemours & Co., Inc.

483,421. **Vulcanized Rubber Solutions.** V. Tanner.

483,496. **Treating Rubber Latex.** Rubber Producers Research Assn., Wool Industries Research Assn., B. H. Wilsdon, and C. M. Blow.

483,563. **Rubber Compositions.** Standard Oil Development Co.

483,605. **Antioxidants.** Monsanto Chemical Co.

483,867. **Rubber Paints.** T. Meyer.

483,907. **Synthetic Resins.** L. D'. Antal.

483,908. **Dicarboxylic Acid Anhydrides.** American Cyanamid Co.

484,299. **Accelerators.** Wingfoot Corp.

484,343. **Vinyl Polymerization Products.** Kulzer & Co., Ges.

GENERAL

United States

20,809. (Reissue). **Elastic Threads.** A. Isaac, Lyon, assignor to Dognin-Société Anon., Villeurbanne, both in Rhone, France.

2,123,883. **Wrapping Tissue.** D. C. Ellsworth, deceased, late of Wilmington, Del., by J. F. Haskins, administrator, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,123,947. **Kitchen Implement.** H. Hertzberg, assignor to Hertzberg Patents, Inc., both of New York, N. Y.

2,124,061. **Sponge.** W. J. Gould, Johnstown, N. Y.

2,124,062. **Play Raft.** G. A. Grant and W. F. Le Moine, both of Oakland, Calif.

2,124,112. **Garment.** R. M. Kapinas, assignor, by mesne assignments, to Munsingwear, Inc., both of Minneapolis, Minn.

2,124,158. **Knee Pad.** D. F. Turner, Detroit, Mich.

2,124,206. **Fastener.** A. F. Mulka, Dortmund, assignor to E. Krause, Berlin, both in Germany.

2,124,210. **Decorative Material.** K. E. Prindle, Shaker Heights, assignor to Dobeckmun Co., Cleveland, both in O.

2,124,259. **Frost Absorber.** C. S. Murch, Augusta, Me.

2,124,280. **Fountain Pen.** F. M. Ashley, Great Kills, assignor to L. Gompers, trustee, New York, both in N. Y.

2,124,316. **Warp Fabric.** P. Schönfeld, Chemnitz, Germany.

2,124,345. **Adjustable Rim.** L. O. Grange, assignor to Safety Vulcanizer Co., both of Chicago, Ill.

2,124,350. **Wheel Assembly.** C. F. Hirshfeld, Detroit, Mich., assignor to Transit Research Corp., New York, N. Y.

2,124,380. **Tire Pressure Indicator.** R. E. Walters and C. E. Ruch, both of Nappanee, Ind.

2,124,393. **Refiner.** R. C. Benner, Niagara Falls, and A. L. Ball, Lewiston, assignors, by mesne assignments, to Carborundum Co., Niagara Falls, both in N. Y.

2,124,405. **Garment.** E. Siegel, assignor to American Lady Corset Co., both of Detroit, Mich.

2,124,455. **Vent Plug.** M. A. Hopkins, assignor to Prest-O-Lite Storage Battery Corp., Indianapolis, Ind.

2,124,456. **Game Apparatus.** G. J. Smythe, near Dayton, O.

2,124,469. **Rim Construction.** T. A. Peterman, Tacoma, Wash.

2,124,574. **Elastic Fabric.** R. Hesse, Melrose, assignor to Everlastik, Inc., Chelsea, both in Mass.

2,124,644. **Shoe Display Form.** W. L. Wardell, assignor to United States Rubber Products, Inc., both of New York, N. Y.

2,124,648. **Condenser Vent.** J. B. Brennan, Fort Wayne, Ind.

2,124,668. **Belt.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,124,687. **Comb.** O. B. Carson, Scarsdale, assignor to American Hard Rubber Co., New York, both in N. Y.

2,124,708. **Driving Device.** H. K. Peter, Liestal, Switzerland.

2,124,712. **Comb and Hair Curler.** E. C. Ruckdeschel, New York, and W. N. Brady, Piermont, assignors to American Hard Rubber Co., New York, both in N. Y.

2,124,769. **Corselet.** H. J. Dubner, New York, N. Y.

2,124,774. **Rubber Product.** L. Gaisman, Woodley, England.

2,124,821. **Tire Tread.** G. Hubach, Springfield, assignor to Fisk Rubber Corp., Chicopee Falls, both in Mass.

2,124,844. **Valve Core.** F. S. Boroughs, Elmhurst, assignor to G. M. Co. Mfg. Co., Inc., Long Island City, both in N. Y.

2,124,909. **Valve Stem.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.

2,124,986. **Sole and Heel.** W. L. Pipes, Elizabeth, N. J., assignor to United States Rubber Products, Inc., New York, N. Y.

2,125,018. **Plug.** W. W. Hamill, Chigwell, England.

2,125,184. **Truck Construction.** O. K. Kjolseth, Erie, Pa., assignor to General Electric Co., a corporation of N. Y.

2,125,255. **Elastic Fabric.** K. G. Douglas, assignor to W. Gorse Co., Inc., both of Needham Heights, Mass.

2,125,334. **Gasket.** P. W. Dempsey, Pittsburgh, assignor to Westinghouse Air Brake Co., Wilmerding, both in Pa.

2,125,338. **Nipple.** G. L. Glossbrenner, Chicago, Ill.

2,125,404. **Castration Device.** E. Snyder, Westbrook, Minn.

2,125,451. **Breechette.** S. A. Kolliner, assignor to Kolliner St. Croix Garment Co., both of Stillwater, Minn.

2,125,482. **Garment.** M. R. Barnes, Los Angeles, Calif.

2,125,555. **Electrical Connecter.** W. A. Frantz, Cleveland, O.

2,125,578. **Casing Repair.** T. W. Mullen, assignor to Bowes Seal-Fast Corp., both of Indianapolis, Ind.

2,125,603. **Pressing Device Padding.** J. R. Crockford, New York, N. Y.

2,125,758. **Bag Manufacturing Machine.** H. F. Waters, New York, N. Y.

2,125,783. **Door Handle.** H. H. Heeman, Lakewood, O.

2,125,786. **Tractor Wheel.** H. Hürlimann, Wil, Switzerland.

2,125,802. **Wheel.** J. Nation, Ree Heights, S. D.

2,125,836. **Conductor Covering.** J. W. Olson, Dobbs Ferry, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.

2,125,850. **Vacuum Cleaner Muffler.** A. E. Norris, Westfield, assignor to Regina Corp., Rahway, both in N. J.

2,125,947. **Midsoles.** I. J. Novak, assignor to Raybestos-Manhattan, Inc., both of Bridgeport, Conn.

2,125,957. **Fountain Pen.** S. M. Sager, Hubbard Woods, Ill., assignor to Sagren Corp., New York, N. Y.

2,126,083. **Wheel.** W. J. Bailey, Beaumont, Tex.

2,126,102. **Target.** R. A. Fowler, Medford, Mass.

2,126,167. **Panel Mounting.** J. Breackevelt, Elkhart, Ind., assignor to Adlake Co., Chicago, Ill.

2,126,214. **Comb.** H. J. Schelhammer, Whitestone, assignor to American Hard Rubber Co., New York, both in N. Y.

2,126,322. **Nipple.** L. Garfield, New York, N. Y.

2,126,327. **Tire Pressure Measuring Device.** W. H. and A. G. Hendel, both of Minneapolis, Minn.

2,126,463. **Anesthetic.** F. E. Guntrip, Santa Barbara, Calif.

2,126,501. **Painter's Guide.** D. G. Puderbaugh, Altoona, Pa.

2,126,540. **Fountain Pen.** B. H. Dicks, Athelstane, Wis.

2,126,550. **Truss.** J. E. Hansen, Rochester, N. Y.

2,126,561. **Heel.** C. Lamb, South Pasadena, Calif.

2,126,654. **Foot for Artificial Limbs.** L. A. Morris, Thayer, Mo.

Dominion of Canada

375,176. **Tie Rod Link.** Columbus Auto Parts Co., assignee of R. E. Klages, both of Columbus, O., U. S. A.

375,178. **Tire Tread.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. K. McNeill, Detroit, Mich., U. S. A.

375,199 and 375,200. **Elastic Strand.** J. R. Kendrick Co., Inc., assignee of W. J. Fox, both of Philadelphia, Pa., U. S. A.

375,238. **Road Covering.** M. E. Kronensberg, Rotterdam, Holland, and L. Sempell, assignees of K. Halbach, both of Düsseldorf, Germany.

375,247. **Garment.** J. J. Cartledge, Guelph, Ont.

375,256. **Auto Fender Beading.** H. L. Fletcher, Toronto, Ont.

375,273 and 375,274. **Rubber Pants.** A. N. Spanel, Rochester, N. Y., U. S. A.

375,289. **Vacuum Cleaner.** Air-Way

Electric Appliance Corp., assignee of F. Riebel, Jr., and D. M. Dow, co-inventors, all of Toledo, O., U. S. A.

375,294. **Vacuum Cleaner.** Air-Way, Ltd., Toronto, Ont., assignee of F. Riebel, Jr., Toledo, O., U. S. A.

375,444. **Suction Cup.** M. Zaiger, Swampscott, Mass., U. S. A.

375,489. **Chemically Resistant Structure.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. H. Harkins, River Edge, N. J., U. S. A.

375,508. **Cleaner Device.** Metal Textile Corp., West Orange, assignee of R. B. Kingman, Orange, both in N. J., U. S. A.

375,528. **Shoe Insole.** Stedfast Rubber Co. (Canada), Ltd., Granby, P. Q., assignee of J. J. Clifford, Reading, Mass., U. S. A.

375,542. **Oil Emulsion Treating Apparatus.** J. V. Stevens, Sapulpa, inventor, and H. R. Hone and F. W. Bailey, both of Tulsa, each an assignee of one-fourth of the interest, both in Okla., U. S. A.

375,553. **Fish Lure.** M. and W. Seigle, co-inventors, both of Hinton, Okla., U. S. A.

375,555. **Tire Valve.** O. Bothe, Düsseldorf, Germany.

375,563. **Medicinal Container.** P. G. Heineman, Albany, N. Y., U. S. A.

375,575. **Shim Structure.** R. W. Springer, Detroit, Mich., U. S. A.

United Kingdom

481,625. **Handle for Bats, Racquets, Etc.** W. Wright.

481,643. **Displaying Device.** T. S. W. Rawlingson.

481,654. **Bumpers.** F. Hanel.

481,870. **Instrument Board Mounting.** Silentbloc, Ltd., and S. W. Jelley.

481,887. **Writing Appliances.** G. Lindsay.

481,940. **Sealing Wires into Vitreous Material.** E. Y. Robinson and Metropolitan-Vickers Electrical Co., Ltd.

481,943. **Dartboards.** R. Sandland.

481,952. **Conduits.** United States Rubber Products, Inc.

481,959. **Mining Machines.** A. Hoy & Co., Ltd., A. Y. Hoy, J. I. Philip, and C. Brooks.

481,974. **Hinges.** F. S. Rippingille.

481,995. **Hand Wheels.** Birmingham Aluminum Casting (1903) Co., Ltd., F. G. Woollard, and G. Pearce.

481,997. **Aircraft Brakes.** Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.

482,052. **Stuffing Box Substitutes.** Siemens-Schuckert-Werke A.G.

482,057. **Aircraft Launching Gear.** Sir G. W. Armstrong Whitworth Aircraft, Ltd., and J. Lloyd.

482,061. **Cable Joints.** Pirelli-General Cable Works, Ltd., and R. E. Horley.

482,067. **Resilient Mountings.** N. Sluyter.

482,072. **Couplings.** Siemens & Halske A.G.

482,083. **Blasting Cartridges.** R. I. Roberts.

482,188 and 482,260. **Resilient Mountings.** H. C. Lord.

482,203. **Switches.** C. H. Parsons, Ltd., and G. B. Handley.

482,264. **Watch Winding Crown.** Junghans A.G. Geb.

482,311. **Fishing Tackle.** G. W. Wilson.

482,332. **Vehicle Wheel Suspension.** J. W. Leighton.

482,355. **Sparking Plugs.** General Motors Corp.

482,363. **Batteries.** F. MacCallum and A. H. Redfern.

482,364. **Latches.** F. G. G. Armstrong.

482,365. **Impression Backing Sheets.** S. A. J. Holmquist.

482,475. **Spanners.** J. W. Dent.

482,502. **Saddles.** V. E. Jorgensen.

482,511. **Resilient Mountings.** Getefo Ges. fur Technischen Fortschritt.

482,518. **Electrolytic Condensers.** Dubilier Condenser Co. (1925), Ltd.

482,541. **Weather Strips.** Worcester Windshields & Casements, Ltd., A. E. E. Jones, and F. C. Browne.

482,608. **Commutators for Electric Machines.** A. E. Edwards (Naamlooze Vennootschap Maatschappij tot Beheer en Exploitatie van Octrooien).

482,642. **Offset Cylinders and Blankets.** Oxvar, Ltd. (Oxford Varnish Corp.).

482,676. **Trousers.** Bainbridge Bros. (Leeds), Ltd., and W. L. Morgan.

482,683. **Elastic Fabrics.** F. F. Schwartz and M. A. Chavannes.

482,685. **Centrifugal Machines.** Hydraulic Brake Co.

482,696. **Injection Molding.** W. W. Triggs, (Erie Resistor Corp.).

482,714. **Syringes.** Novocol Chemical Mfg. Co. of Canada, Ltd.

482,730. **Lubricator Couplings.** F. Schlenk.

482,732. **Massage Appliances.** G. Granger.

482,744. **Fastenings for Footwear, Bags, Etc.** P. P. Nazir.

482,749. **Camera.** R. Gumbiner.

482,766. **Chucks.** A. Herbert, Ltd., and A. H. Lloyd.

482,774. **Compound Sheet Materials.** Naamlooze Vennootschap Maatschappij tot Beheer en Exploitatie van Octrooien.

482,770. **Crutches.** A. F. Browne.

482,797. **Air Filters.** Burgess Battery Co.

482,799. **Joints.** Thompson Products, Inc.

482,801. **Corsets, Etc.** T. P. Williams, trading as Chilcot & Williams, and W. H. Bassett.

482,817. **Winding Bobbins.** J. Brandwood.

482,819. **Press Roll Assemblies.** Beloit Iron Works.

482,824. **Suction Cleaner Sound Muffler.** Hoover Holding Co., Ltd., (Hoover Co.).

482,837. **Woven Fabrics.** C. Clutsom.

482,855. **Clocks.** National Clock Mfg. Co., Ltd., and S. Gold.

482,869. **Lamps.** Flexible Lamps, Ltd., and E. P. A. Bower.

482,890. **Disinfecting Apparatus.** W. J. Morton.

482,898. **Paving Units.** Universal Rubber Paviors, Ltd., and L. Gaisman.

482,912. **Cables.** Siemens & Halske A.G.

482,913. **Concrete Shuttering.** M. A. Roemmele.

482,919. **Permanent Waving Apparatus.** Indefrisable Automatique.

482,928 and 482,932. **Elastic Threads.** J. R. Kendrick Co., Inc.

482,955. **Filters.** Permutit Co., Ltd.

482,968. **De-Airing Clay Apparatus.** J. M. and C. L. Willis.

482,972. **Heckling Machine.** H. Campbell & Co., Ltd., and J. Patterson.

482,983. **Resilient Mountings.** Getefo Ges. fur Technischen Fortschritt.

482,996. **Moving Signs.** R. T. and G. H. Riches.

483,005. **Draught Excluder.** H. G. W. C. Miles.

483,018. **Model Aircraft.** W. E. Back.

483,047. **Spring Surfaces.** V. Vanhaegenborgh.

483,072. **Potentiometers.** G. Kent, Ltd.

483,104. **Door Stop and Holder.** J. H. Bennetts.

483,161. **Stapling Fibers.** O. Miyaki.

483,172. **Mounting Engines.** Daimler-Benz A.G.

483,191. **Shock Absorbers.** Etablissements C. Faure-Roux.

483,200. **Window Blinds.** Laycock Engineering Co., Ltd., and W. E. Thompson.

483,267. **Fire Extinguisher.** Nitrokemia Ipartelepek R. T.

483,269. **Heel.** G. Grimwood.

483,284. **Motor Mountings.** Rexair Corp.

483,341. **Garment Pockets.** J. L. Hillier.

483,373. **Rubber Springs.** Getefo Ges. fur Technischen Fortschritt.

483,386. **Latch Striking-Plate.** Pressed Steel Co., Ltd., and W. Swallow.

483,392. **Refuse Bins.** G. H. Eveson.

483,396. **Corsets, Etc.** R. & W. H. Symington & Co., Ltd., and S. Allbright.

483,487. **Condensers.** Glen's Patents & Holdings, Ltd.

483,501. **Grinding Machines.** G. H. Schieferstein.

483,515. **Switches.** M. Edmunds.

483,532. **Joints.** M. Goldschmidt.

483,555. **Surgical Suction Appliances.** A. B. Hughes.

483,561. **Radiators.** C. L. Cowdrey and J. W. Tate.

483,568. **Trays.** R. S. Gill.

483,573. **Dough Tester.** Brabender Ges.

483,596. **Polisher.** Briggs Mfg. Co.

483,611. **Tire Valves.** Gowo Soc. Anon.

483,619. **Corsets.** H. A. Smith.

483,631. **Lamps.** Flexible Lamps, Ltd., and E. P. A. Bower.

483,644. **Compound Air Compressor.** L. W. Slade and H. C. Wescombe.

483,669. **Transmission Chain.** E. Bugatti.

483,703. **Mounting Motors.** L. Gardner & Sons, Ltd., and J. H. S. and J. K. Gardner.

483,749. **Draught Excluder and Rattle Preventer.** T. D. Bracken.

483,787. **Tape.** P. Van Cleef.

483,833. **Flexible Tube.** Superflexit, Ltd., and W. H. Grint.

483,840. **Tumbler Switch.** J. B. Tucker.

483,868. **Gas-Proof Shelter.** F. J. Leake.

483,870. **Girdle Slips.** A. Boudo.

483,892. **Curlers.** N. L. Solomon.

483,916. **Key Identification Device.** J. T. Stevenson and J. McGowan.

483,930. **Level.** J. Rabone & Sons, Ltd., and A. H. Godfrey.

483,932. **Wringers.** Acme Wringers, Ltd., and J. W. Burt.

483,941. **Tube Bullet.** I. T. Stephens.

483,953. **Washing Machines.** British Thomson-Houston Co., Ltd.

483,965. **Draught Excluder.** T. A. Baxter.

484,026. **Camera Lens Hood.** Voigtlander & Sohn A.G.

484,056. **Filter Element.** Soc. Industrielle Des Telephones (Constructions Electriques Caoutchouc Cables).

484,079. **Coated Fabrics.** British Belting & Asbestos, Ltd., and E. W. Sisman.

484,153. **Hand Device for Printing Designs.** W. Shaw and E. P. Weston, (trading as True Grade Pattern Service).

484,203. **Display Panels.** N. and F. E. L. Sandor.
484,210. **Taps for Anti-Splash Appliance.** Webb Lamp Co., Ltd., and J. L. Webb.
484,216. **Steering Gear.** Steyr-Daimler-Puch A.G.
484,266. **Stays.** Fiat Soc. Anon.
484,312. **Tire Valves.** M. A. Mackae.
484,389. **Hose.** G. Carpenter and Electric Hose & Rubber Co., Ltd.
484,393. **Magnetos.** Fabrica Italiana Magneti Marelli.
484,440. **Draught Excluder.** J. Duncombe, and W. J. Evans.
484,531. **Joints.** G. H. Schieferstein.
484,552. **Ventilator.** Briggs Mfg. Co.
484,567. **Flexible Tube.** Superflexit, Ltd., and W. H. Grint.
484,593. **Fountain Pen.** Mentmore Mfg. Co., Ltd., and A. E. Andrews.
484,709 and 484,710. **Balloons.** I. Worobjpff and K. Franke.
484,768. **Coupling.** M. Yanagi.
484,815. **Multiple Piping.** G. Kent, Ltd., J. A. M. Grout, and G. P. Cooke.
484,937. **Level.** G. H. Payne

TRADE MARKS

United States

358,751. **Puck.** Combs. New York Hamburger Gummi-Waaren Co., Hamburg, Germany.
358,769. **Metal Flex.** Soles and heels. S & K Rubber Co., Lima, O.
358,770. **Sava-wave.** Bathing caps. I. B. Kleinert Rubber Co., New York, N. Y.
358,809. **Nu-Note.** Corsets, brassieres, etc. American Lady Corset Co., Detroit, Mich.
358,852. **Miss Vanity.** Corsets, brassieres, etc. Vanity Corset Co., Inc., New York, N. Y.
358,859. **Zip-Ins.** Corsets and brassieres. Garfinkel & Ritter, New York, N. Y.
358,860. **Bandrite.** Rubber bands. Goldsmith Bros., New York, N. Y.
358,872. **Kedsman.** Footwear. United States Rubber Products, Inc., New York, N. Y.
358,873. **Alicienne.** Corsets, brassieres, etc. I. Newman & Sons, Inc., New Haven, Conn.
358,896. Representation of a man fastening a garter on his sock. Garters, suspenders, etc. A. Stein & Co., Chicago, Ill.
358,899. **Flex-Gore.** Elastic webbing. Moore Fabric Co., Pawtucket, R. I.
358,901. Label containing representation of a bird on a tree and the words **"Burts' Sav-Yur."** Rubbers. B. A. Martin, Culver, Minn.
358,903. **Melt-Away.** Reducing garments. Neatform Co., Inc., New York, N. Y.
358,918. **Formez.** Girdles, brassieres, etc. W. Barg, doing business as True Form Corset Co., Philadelphia, Pa.
358,936. **Recedal.** Heels. J. Pinaud, Atlantic Highlands, N. J.
358,945. **Simplox.** Sanitary belts. I. B. Kleinert Rubber Co., New York, N. Y.
385,951. **ACR.** Wire and cable. Anaconda Wire & Cable Co., New York, N. Y.
358,952. **ANW.** Wire and cable. Anaconda Wire & Cable Co., New York, N. Y.
358,953. **AHR.** Wire and cable. Anaconda Wire & Cable Co., New York.
358,954. **AMR.** Wire and cable. Anaconda Wire & Cable Co., New York, N. Y.
358,964. **Shacklube.** Rubber lubricant. A. R. Davis, doing business as Oilless Shacklube Laboratories, Chicago, Ill.
358,966. **Super Craft.** Tires. Pennsylvania Rubber Co., Jeannette, Pa.
358,982. **Jane Lee.** Girdles and brassieres. Independent Merchandising Corp., New York, N. Y.
358,985. **Nevastane.** Footwear. Woodstock Rubber Co., Ltd., Woodstock, Ont., Canada.
358,990. **Famous Fashion Shops.** Brassieres, girdles, corselets, and bathing hats. Famous Fashion Shop, Inc., Astoria, N. Y.
358,996. **Jean Sutton.** Girdles, brassieres, etc. W. T. Knott Co., Inc., New York, N. Y.
358,999. **Shugor.** Elastic fabrics. T. Taylor & Sons, Inc., Hudson, Mass.
359,020. **Tally Ho.** Golf balls. Great Western Athletic Goods Co., Chicago, Ill.
359,033. **Bon-Lee.** Corsets and brassieres. Bonwit, Lennon & Co., Inc., Baltimore, Md.
359,052. **Shado's-Way.** Girdles. Rosalind Underwear Co., Inc., New York, N. Y.
359,178. **Protinol.** Adhesive for securing labels to rubber surfaces. Fales Chemical Co., Inc., Cornwall Landing, N. Y.
359,208. **"It."** Brassieres, corsets, garter belts, etc. Tre-Zur Brassiere Co., Inc., Los Angeles, Calif.
359,213. Label containing representation of a man building a tire and the words: **"Guild of Tire Craftsmen."** Patching and cushion gum and strip rubber for retreading. Oliver Tire & Rubber Co., Oakland, Calif.
359,218. **Frund's Flex-O-Fix.** Plastic rubber. Frund Products Co., Chicago, Ill.
359,223. **X-Way Does for Your Comfort What X-Ray Did for Science.** Suspenders, garters, and belts. Mack Cohen & Nadle, New York, N. Y.
359,248. **Adjust-Eze Foundations.** Brassieres, girdles, etc. Even-Pul Foundations, New York, N. Y.
359,249. **Even-Pul Life Class.** Brassieres, girdles, etc. Even-Pul Foundations, New York, N. Y.
359,285. **Gencaseal.** Wires and cables. General Cable Corp., New York, N. Y.
359,293. **Winsome.** Foundations and girdles. Franco Corset Co., New York, N. Y.
359,314. **Store Service.** Tires. Federal Rubber Co., Chicopee Falls, Mass.
359,319. **Lorraine.** Sponges. Glemby Co., Inc., New York, N. Y.

LEGAL

Road Hazard Tire Warranty Held to Constitute Insurance

In a decision handed down in the Ohio State Supreme Court on July 13, 1938, it was held that "a contract whereby the vendor of automobile tires undertakes to guarantee the tires sold against defects in material or workmanship without limit as to time, mileage, or service, and further expressly guarantees them for a specified period against 'blowouts, cuts, bruises, rimcuts, under-inflation, wheels out of alignment, faulty brakes, or other road hazards that may render the tire unfit for further service (except fire or theft),' or contracts to indemnify the purchaser 'should the tire fail within the replacement period' specified, without limitation as to cause of such 'failure,' is a contract 'substantially amounting to insurance' within the provisions of Section 665, General Code, which requires such guarantor or insurer to comply with the laws of the state authorizing and regulating the business of insurance."

In reaching this decision the court brought out that "a warranty promises indemnity against defects in the article sold, while insurance indemnifies against loss or damage resulting from perils outside of and unrelated to defects in the article itself."

U. S. Excise Taxes Included in Canadian Tire Duties

Appraisers' Bulletin Miscellaneous Series No. 17, of July 15, 1938, issued by the Canadian Department of National Revenue to customs and excise officers, contains instructions to include in the fair market value for regular ad valorem duties the United States excise taxes in effect as of July 1, 1938, on various manufactures including tires and inner tubes wholly or in part of rubber, according to a report of July 30 from the Office of the American Commercial Attaché, Ottawa.

United States internal excise taxes are excluded from values for Canadian dumping duty purposes under the United States-Canada trade agreement effective January 1, 1936[1], so that, although the current taxes are to be included as a part of the value for regular duty, they may be eliminated from selling prices to Canadian importers without dumping duty being applied.

The above bulletin supersedes earlier similar instructions and was issued following the passage of the United States Revenue Act of 1938 revising the United States excise tax provisions.

[1] See *Commerce Reports*, Feb. 29, 1936.

Pipe Joint Compound

Metal to metal joints are sealed with Rockwood pipe joint compound, a new material for general service on threaded pipe joints or gaskets. It is claimed that this compound: lubricates threads on pipe joints; surface hardens into protective skin; seals without cementing—compound beneath outer skin does not harden, thus permitting joint to be broken easily even after several years' service; contains no harmful chemicals; and does not require thinning.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	June 25	July 30	Aug. 6	Aug. 13	Aug. 20
July	11.31	.....	.....	.....	.....
Aug.	.....	16.08	16.00	15.91	16.27
Sept.	11.45	16.10	16.06	15.96	16.32
Dec.	11.63	16.25	16.19	16.14	16.53
Mar.	11.78	16.28	16.26	16.22	16.61
June	.....	16.38	16.34	16.33	16.70
July	.....	.....	16.37	16.37	16.72
Volume per week (tons)	9,780	18,550	15,030	10,930	11,020

New York Quotations

New York outside market rubber quotations in cents per pound

	Aug. 27, 1937	July 27, 1938	Aug. 26, 1938
Plantations			
Rubber latex...*gal.*	67/68	59/60	61.62
Paras			
Upriver fine	19½	15	15½
Upriver fine	*24	*16½	*18¾
Upriver coarse	12	9	11
Upriver coarse	*21	*14	*15
Islands fine	19¼	15	15
Islands fine	*24	*16½	*18
Acre, Bolivian fine	19½	15	15¾
Acre, Bolivian fine	*25	*16½	*18¾
Beni, Bolivian fine	20¼	15½	16¼
Madeira fine	19¾	15	15½
Caucho			
Upper ball	11	9½	11
Upper ball	*21	*14	*15
Lower ball	10½	9	10
Pontianak			
Pressed block	11/32	11/23	10½/20
Guayule			
Duro, washed and dried	14½	12	13¼
Ampar	15	12½	13¾
Africans			
Rio Nuñez	20	17	17
Black Kassai	19	16½	16½
Prime Niger flake	28	25	25
Gutta Percha			
Gutta Siak	10½	12	12¼
Gutta Soh	19½	14½	15
Red Macassar	1.10/1.40	1.10/1.20	1.20/1.90
Balata			
Block, Ciudad Bolivar	30	..	..
Manaos block	28½	29	29
Surinam sheets	36	37	38
Amber	40	39	40

*Washed and dried crepe. Shipments from Brazil.

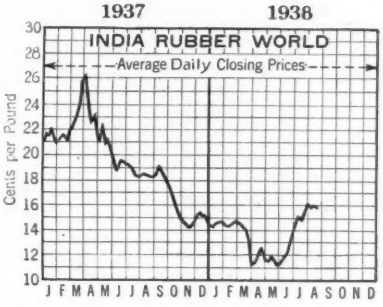
THE Commodity Exchange table published here shows prices of representative future contracts on the New York market during the past two months.

During the first half of August the rubber market ruled generally quiet with prices holding an even position. Toward the end of the month, however, increased activity pushed prices upward. December futures closed at 16.11¢ per pound on August 1 and with minor fluctuations held steady to close at 16.17¢ on August 18. Following this under the influence of strong buying by commission houses and factory interests, the price moved upward to reach 16.74¢ per pound, a new high for the year, on August 24. The closing price on August 29 was 16.31¢ per pound. During the past four weeks the maximum variation in week-end closing prices for delivery during the next year was 0.46¢ per pound. Trading during the first three weeks of the month was inactive.

Crude rubber consumption in the United States amounted to 32,209 long tons for July, an increase of 5.2% over the June figure and the largest for any month since November, 1937. In view of the bright outlook for the fall in the automotive industry and owing to the current increased activity in the replacement tire field, conservative estimates by the trade for the fourth quarter place consumption at 120,000 tons, or 40,000 tons per month average. Favorable feature in recent rubber statistics was the large reduction in domestic stocks. On page 78 are reported U. S. statistics on imports, consumption, stocks, and crude rubber afloat.

The International Rubber Regulation Committee announced on August 9 that restriction would be continued for five more years.[1]

[1] Details of the new regulation agreement were given in INDIA RUBBER WORLD, April, 1938, pp. 41-44.



New York Outside Market—Spot Ribbed Smoked Sheets

Crop licenses for the fourth quarter of 1938 on native rubber in Netherland India will be issued on the basis of a 45% export quota, which is in effect during this quarter. This decision has been made because it has been found impossible to await the result of the I.R.R.C. meeting September 12.

New York Outside Market

The outside market during August was generally quiet. Shipment offerings from the Far East were for the most part too high to be workable. Rubber dealers reported that considerable inquiries were received from factories, but the tendency has been to await further developments that may affect the price. If the I.R.R.C. should maintain the present 45% quota for the fourth quarter, it is believed that the price of rubber will rise further. After closing at 15 15/16¢ per pound on August 1, the price of ribbed smoked sheets held steady for the first three weeks of the month to close at the same level on August 18, after which it moved upward in company with the futures market to close at 16 9/16¢ per pound, a new high

(*Continued on page 76*)

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	July, 1938						August, 1938												
	25	26	27	28	29	30*	1	2	3	4	5	6*	8	9	10	11	12	13*	15	16	17	18	19	20*
No. 1 Ribbed Smoked Sheet	16	15 13/16	16 1/4	16 3/16	16 1/16	..	15 13/16	15 13/16	15 13/16	15 13/16	16	..	16 1/16	16 1/16	15 13/16	15 13/16	15 13/16	..	15 3/4	15 7/8	15 7/8	15 13/16	16 1/4	..
No. 2 Ribbed Smoked Sheet	15 15/16	15 3/8	15 13/16	15 3/4	15 11/16	..	15 15/16	15 3/8	15 3/8	15 1/4	15 5/16	..	15 5/8	15 5/8	15 1/2	15 1/2	15 1/2	..	15 5/16	15 1/16	15 1/16	15 1/2	15 13/16	..
No. 3 Ribbed Smoked Sheet	14 13/16	14 3/4	15 1/16	15 1/8	15	..	14 7/8	14 3/4	14 3/4	14 5/8	14 13/16	..	15	15	14 7/8	14 7/8	14 7/8	..	14 13/16	14 13/16	14 13/16	14 7/8	15 1/16	..
No. 4 Ribbed Smoked Sheet	14 3/4	14 5/16	14 13/16	14 7/8	14 3/4	..	14 11/16	14 1/2	14 1/2	14 5/16	14 3/4	..	14 13/16	14 3/4	14 5/8	14 5/8	14 11/16	..	14 1/2	14 5/8	14 5/8	14 13/16	15	..
No. 1 Thin Latex Crepe	16 13/16	16 5/8	17	17	16 15/16	..	16 15/16	16 11/16	16 11/16	16 5/16	16 3/4	..	16 13/16	16 13/16	16 11/16	16 11/16	16 3/4	..	16 5/8	16 3/4	16 3/4	16 3/4	17 1/16	..
No. 1 Thick Latex Crepe	17 3/16	17 1/16	17 5/16	17 5/16	17 1/16	..	17 1/16	17 3/16	17 3/16	17 1/4	17 1/2	..	17 1/16	17 1/16	17 5/16	17 5/16	17 3/4	..	17 5/16	17 3/4	17 3/4	18	18 1/16	..
No. 1 Brown Crepe	15 1/16	14 7/8	15 1/16	15 1/4	15 1/16	..	15 1/16	14 11/16	14 11/16	14 13/16	15 1/16	..	15 3/16	15 3/16	15	15	15	..	14 13/16	14 13/16	14 13/16	15	15 1/16	..
No. 2 Brown Crepe	14 7/8	14 11/16	15 3/16	15	14 15/16	..	14 13/16	14 11/16	14 11/16	14 1/16	14 7/8	..	14 11/16	14 15/16	14 13/16	14 13/16	14 7/8	..	14 11/16	14 13/16	14 13/16	14 7/8	15 1/16	..
No. 2 Amber	15	14 13/16	15 1/4	15 1/16	15 1/16	..	15	14 7/8	14 7/8	14 3/4	15	..	15 1/16	15 1/16	14 15/16	14 15/16	15	..	14 13/16	14 13/16	14 13/16	15	15 1/16	..
No. 3 Amber	14 7/8	14 11/16	15 1/16	15	14 15/16	..	14 13/16	14 11/16	14 11/16	14 1/16	14 7/8	..	14 11/16	14 15/16	14 13/16	14 13/16	14 7/8	..	14 11/16	14 13/16	14 13/16	14 7/8	15 1/16	..
No. 4 Amber	14 3/8	14 1/16	14 5/16	14 1/2	14 1/16	..	14 1/16	14 3/16	14 1/16	14 1/16	14 3/8	..	14 1/16	14 1/16	14 3/16	14 3/16	14 1/16	..	13 13/16	14 1/16	14 1/16	14 1/16	14 1/16	..
Rolled Brown	13	12 15/16	13 1/4	13 1/16	13 1/16	..	12 15/16	12 15/16	12 15/16	12 15/16	13	..	13 1/16	13 1/16	12 7/8	12 7/8	12 15/16	..	12 3/4	12 7/8	12 7/8	12 15/16	13 1/4	..

*Closed

Distributed to the RUBBER INDUSTRY

MICRONEX
Beads or Compressed
Standard for Rubber Reinforcing

FUMONEX
Beads or Compressed
Semi-reinforcing Black for Rubber

VELVETEX
Inert Rubber Filler

OXIDES OF IRON
Pigments of outstanding Strength and Purity

STEARIC ACID
Stearex Beads
Dispersing and Vulcanizing Assistant

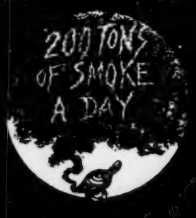
CLAY
No. 1 Full reinforcing · No. 2 Semi-reinforcing
Rubber Filler

PARMR
Mineral Rubber

CARBITUM
Reinforcing and Plasticising Coal Tar Hydrocarbon

BINNEY & SMITH CO.

41 East 42nd St.



New York, N.Y.

COMPOUNDING INGREDIENTS

ACTIVITY in the compounding materials markets during August showed only slight improvement over the preceding month. However, with better sentiment prevailing and with more definite indications of increased activity in new car production, it is generally believed that business will show a marked improvement during the next few months. A broadened equipment demand for tires coupled with a maintenance of the present volume in the replacement field should obtain a definite acceleration of activity in the tire industry. Another factor toward an upswing is the current low state of compounding material inventories in the hands of consumers. Prices in general continue in an unchanged position.

CARBON BLACK. Shipments during August to tire producers were only slightly better than the preceding month. Prices remain unchanged, and present indications do not point toward any alteration in the near future.

FACTICE OR RUBBER SUBSTITUTE. The demand for rubber substitute increased during August, and a further improvement is anticipated during the next few months. Prices remain steady.

LITHARGE. In company with other lead oxides litharge has held steady in price. Demand has been fair.

LITHOPONE. While there was little movement of lithopone into consuming channels during August, a decided upturn is expected in September. Prices have not changed.

RUBBER CHEMICALS. There has been a slight increase in demand for rubber chemicals, but no price changes of any consequence.

RUBBER SOLVENTS. Orders from Akron tire interests continued light, with the outlook for September more promising. Prices for both light and heavy grades of solvents continue steady.

STEARIC ACID. There has been a fair movement of acid into consuming channels on contracts, but new business was quiet. Quotations are unchanged.

TITANIUM PIGMENTS. Since the reduction of 1¢ per pound on titanium dioxide and ¼¢ per pound on composite pigments at the close of the second quarter, no further change in prices occurred. Withdrawals against contracts by rubber manufacturing accounts have shown improvement since the beginning of the third quarter.

ZINC OXIDE. Some acceleration took place recently in the movement of zinc oxide to the rubber industry. The demand from the paint industry continues relatively better than that from the rubber industry. Prices have not been altered, and no early change is expected unless the metal markets change.

New York Quotations

August 24, 1938

Prices Not Reported Will Be Supplied on Application

Abrasives			
Pumicestone, powdered	lb.	$0.03	/$0.035
Rottenstone, domestic	lb.	.03	/ .035
Silica, 15	ton	38.00	
Accelerators, Inorganic			
Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.0675/	.0725
Accelerators, Organic			
A-1	lb.	.26	
A-5-10	lb.	.35	/ .40
A-7	lb.	.42	/ .55
A-10	lb.	.35	/ .40
A-11	lb.	.52	/ .65
A-19	lb.	.52	/ .65
A-32	lb.	.70	/ .80
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
A-100-F-50	lb.	.25	/ .35
A-433	lb.	.45	/ .55
Accelerator 49	lb.	.42	
737	lb.	.42	/ .43
737-50	lb.	.25	/ .26
808	lb.	.70	/ .72
833	lb.	1.15	
Acrin	lb.	.55	
Aldehyde ammonia	lb.	.70	
Altax	lb.	.55	/ .65
B-J-F	lb.	.50	/ .55
Beutene	lb.	.70	/ .75
Butyl Zimate	lb.	3.00	
C-P-B	lb.	2.00	
Captax	lb.	.50	/ .60
Crylene	lb.	.40	/ .47
Paste	lb.	.30	/ .36
D-B-A	lb.	2.00	
Di-Esterex	lb.	.60	/ .70
N	lb.	.60	/ .70
Di-ortho-tolylguanidine	lb.	.44	/ .46
Diphenylguanidine	lb.	.35	/ .36
DOTG	lb.	.47	
DPG	lb.	.35	/ .45
El-Sixty	lb.	.50	/ .65
Ethylideneaniline	lb.	.42	/ .43
Ethyl Zimate	lb.	3.00	
Formaldehyde P.A.C.	lb.	.0625	
Formaldehydeaniline	lb.	.31	
Formaldehyde-para-toluidine	lb.	.52	/ .54
Guantal	lb.	.40	/ .50
Hepteen	lb.	.35	/ .40
Base	lb.	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	lb.	.47	
Technical	lb.	.36	
Lead oleate, No. 999	lb.	.12	
Witco	lb.	.15	
Monex	lb.	3.00	
Novex	lb.		
O. N. V.	lb.	1.00	/ 1.10
O-X-A-F	lb.	.50	/ .55
Ovac	lb.	.50	/ .55
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	$1.00	/$1.10
Pip-Pip	lb.	2.50	
Pipsolene	lb.	1.55	/ 1.85
R-2	lb.	1.40	/ 1.80
Base	lb.	3.65	
R-23	lb.	.40	
R & H 50-D	lb.	.42	/ .43
Rotax	lb.	.60	/ .65
Safex	lb.	1.20	/ 1.30
Santocure	lb.	1.05	/ 1.30
Super-sulphur No. 1	lb.	.50	
No. 2	lb.	.20	/ .22
Tetrone A	lb.	3.00	
Thiocarbanilide	lb.	.24	/ .30
Thionex	lb.	3.00	
Trimene	lb.	.55	/ .65
Base	lb.	1.05	/ 1.20
Triphenylguanidine (TPG)	lb.	.52	
Tuads	lb	3.00	
Ureka	lb.	.60	/ .75
Blend B.	lb.	.60	/ .75
C	lb.	.56	/ .65
Vulcanex	lb.	.42	/ .43
Vulcanol	lb.	.85	
Z-B-X	lb.	2.50	
Z-88	lb.	.44	/ .60
P	lb.	.51	
Zenite	lb.	.46	/ .48
A	lb.	.53	/ .55
B	lb.	.46	/ .48
Zimate	lb.	3.00	
Activator			
Barak	lb.	.50	
Age Resisters			
AgeRite Alba	lb.	1.50	/ 2.10
Exel	lb.	1.00	/ 1.02
Gel	lb.	.57	/ .77
Hipar	lb.	.65	/ .67
HP	lb.		
Powder	lb.	.52	/ .54
Resin	lb.	.52	/ .73
D	lb.	.52	/ .73
Syrup	lb.		
White	lb.	1.25	/ 1.75
Albasan	lb.	.70	/ .75
Aminox	lb.	.52	/ .61
Antox	lb.	.56	
B-L-E	lb.	.52	/ .61
Powder	lb.	.65	/ .74
B-X-A	lb.	.55	/ .61
Copper Inhibitor X-872	lb.	1.15	
Flectol B	lb.	.52	/ .65
H	lb.	.52	/ .65
White	lb.	.90	/ 1.15
M-U-F	lb.	1.50	
Neozone (standard)	lb.	.63	
A	lb.	.52	/ .54
B	lb.	.63	
C	lb.	.52	/ .54
D	lb.	.52	/ .54
E	lb	.63	
Oxynone	lb.	.64	/ .80
Parazone	lb.	$0.68	
Perflectol	lb.	.65	/$0.75
Permalux	lb.	1.20	
Santoflex A	lb.	.65	/ .75
B	lb.	.52	/ .65
Santowhite	lb.	.95	/ 1.20
Solux	lb.	1.30	
Thermoflex A	lb.	.65	/ .67
V-G-B	lb.	.52	/ .61
Alkalies			
Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70	/ 3.55
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.15
Antiscorch Materials			
A-F-B	lb.	.35	/ .40
Antiscorch T	lb.	.90	
R-17 Resin (drums)	lb.	.10	
RM	lb.	1.25	
Retarder W	lb.	.36	
U.T.B.	lb.	.35	/ .40
Antisun Materials			
Heliozone	lb.	.27	
Sunproof	lb.	.27	/ .30
Colors			
BLACK			
Du Pont powder	lb.	.42	/ .44
Lampblack (commercial)	lb.	.15	
BLUE			
Brilliant	lb.		
Du Pont dispersed	lb.	.70	/ 3.60
Powders	lb	.45	/ 3.75
Prussian	lb.	.0375	
Toners	lb.	.08	/ 3.85
BROWN			
Mapico	lb.	.11	
GREEN			
Brilliant	lb.		
Chrome, light	lb.		
medium	lb.	.22	
oxide (freight allowed)	lb.		
Dark	lb.		
Du Pont dispersed	lb.	.87	/ 1.60
Powders	lb.	1.00	/ 2.00
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light	lb.		
Toners	lb.	.85	/ 3.75
ORANGE			
Du Pont dispersed	lb.	.80	/ .90
Powders	lb.	.80	/ 2.50
Lake	lb.		
Toners	lb.	.40	/ 1.60
ORCHID			
Toners	lb.	1.50	/ 2.00
PINK			
Toners	lb.	1.50	/ 4.15
PURPLE			
Permanent	lb.		
Toners	lb.	.60	/ 2.10

RED

Antimony			
Crimson, 15/17%	lb.	$0.45	
R. M. P. No. 3	lb.	.48	
Sulphur free	lb.	.50	
R.M.P.	lb.	.52	
Golden 15/17%	lb.	.28	
7-A	lb.	.37	
Z-2	lb.	.23	
Aristi	lb.	1.75	
Cadmium, light (400 lb. bbls.	lb.	.70	/$0.75
Chinese	lb.		
Crimson	lb.		
Du Pont dispersed	lb.	.85	/ 2.05
Powders	lb.	.30	/ 1.40
Mapico	lb.	.0925	
Medium	lb.		
Rub-Er-Red, Easton, Pa., bbls.	lb.	.0925	
Scarlet	lb.		
Toners	lb.	.08	/ 2.00

WHITE

Lithopone (bags)	lb.	.04½/	.04¾
Albalith Black Label-11	lb.	.04½/	.04¾
Astrolith	lb.	.04½/	.04¾
Azolith	lb.	.04½/	.04¾
Cryptone-19	lb.	.05⅝/	.05⅞
CB-21	lb.	.05⅝/	.05⅞
ZS No. 20	lb.	.08¾/	.08⅝
86	lb.	.08¾/	.08⅝
230	lb.	.08¾/	.08⅝
Sunolith	lb.	.04½/	.04¾
Ray-Bar	lb.	.05⅝/	.06⅛
Ray-Cal	lb.	.05⅝/	.06⅛
Rayox	lb.	.15	/ .18
Titanolith (5-ton lots)	lb.	.05⅝/	.05⅞
Titanox-A (50-lb. bags)	lb.	.15	/ .1575
B (50-lb. bags)	lb.	.05⅝/	.05⅞
30 ((50-lb. bags)	lb.	.05⅝/	.05⅞
C (50-lb. bags)	lb.	.05⅝/	.05⅞
M	lb.	.05⅝/	.05⅞
Ti-Tone	lb.		
Zinc Oxide			
Azo ZZZ-11	lb.	.0625/	.065
44	lb.	.0625/	.065
55	lb.	.0625/	.065
66	lb.	.0625/	.065
French Process, Florence			
White Seal-7 (bbls.)	lb.	.085	/ .0875
Green Seal-8	lb.	.08	/ .0825
Red Seal-9	lb.	.075	/ .0775
Kadox, Black Label-15	lb.	.065	/ .0675
No. 25	lb.	.075	/ .0775
Red Label-17	lb.	.065	/ .0675
Horse Head Special 3	lb.	.0625/	.065
XX Red-4	lb.	.0625/	.065
23	lb.	.0625/	.065
72	lb.	.0625/	.065
78	lb.	.0625/	.065
80	lb.	.0625/	.065
103	lb.	.0625/	.065
110	lb.	.0625/	.065
St. Joe (lead free)			
Black Label	lb.	.0625/	.065
Green Label	lb.	.0625/	.065
Red Label	lb.	.0625/	.065
U.S.P.	lb.	.095	/ .0975
White Jack	lb.	.08¾/	.08⅝
Zopaque (bags)	lb.	.15	/ .1575

YELLOW

Cadmolith (cadmium yellow), 400 lb. bbls.	lb.	.45	/ .50
Du Pont dispersed	lb.	1.25	/ 1.60
Powders	lb.	.70	/ 1.37
Lemon	lb.		
Mapico	lb.	.0675	
Toners	lb.	2.50	

Dispersing Agents

Darvan	lb.	.30	/ .50
Nevoll (drums)	lb.	.0215	
Santomerse S	lb.	.11	/ .25

Fillers, Inert

Asbestine, c.l., f.o.b., mills	ton	15.00	
Barytes	ton	30.00	/36.00
f.o.b., St. Louis (50 lb. paper bags)	ton	22.85	
off color, domestic	ton	20.00	/25.00
white, imported	ton	29.00	/32.00
Blanc fixe, dry, precip.	lb.	.03	/ .035
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.02	/ .03
Kalite No. 1	ton	24.00	/50.00
3	ton	34.00	/60.00
Magnesia, calcined, heavy	lb.	.04	
Carbonate, l.c.l.	lb.	.07	/ .095
Pyrax A	ton	7.50	/20.00
Whiting			
Columbia Filler	ton	9.00	/14.00
Guilders	100 lbs.		
Hakuenka	lb.		
Paris white, English cliff-stone	100 lbs.		
Southwark Brand, Commercial	100 lbs.		
All other grades	100 lbs.		
Suprex, white extra light	ton	45.00	/60.00
heavy	ton	45.40	/60.00
Witco, c.l.	ton	6.00	

Finishes

Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd.	100 lbs.		
potato	lb.		
Talc	ton	25.00	/45.00

Flock

Cotton flock, dark	lb.	$0.11	/$0.13
dyed	lb.	.45	/ .85
white	lb.	.18	/ .20
Rayon flock, colored	lb.	1.10	/ 2.00
white	lb.	.90	

Latex Compounding Ingredients

Accelerator 85	lb.	.35	
89	lb.	1.40	
122	lb.	1.55	
552	lb.	2.50	
Aerosol	lb.	.45	
Antox, Dispersed	lb.	.42	
Aquarex A	lb.	.35	
D	lb.	.75	
F	lb.	.85	
Areskap No. 50	lb.	.18	/ .24
100, dry	lb.	.39	/ .51
Aresket No. 240	lb.	.16	/ .22
300, dry	lb.	.42	/ .50
Aresklene No. 375	lb.	.35	/ .50
400, dry	lb.	.51	/ .65
Black No. 25, Dispersed	lb.	.22	/ .40
Catalpo	ton		
Color Pastes, dispersed	lb.	.35	/ 1.75
Dispersex No. 15	lb.	.11	/ .12
No. 20	lb.	.08	/ .10
Emo, brown	lb.	.15	
white	lb.	.15	
Factice Compound, Dispersed	lb.	.36	
Heliozone, Dispersed	lb.	.25	
Igepon A	lb.		
MICRONEX, Colloidal	lb.	.055	/ .07
Nekal BX (dry)	lb.		
Palmol	lb.	.10	
Pipsol X	lb.	3.05	/ 3.55
R-23	lb.	.57	
RN-2	lb.	1.40	/ 1.80
S.1 (400 lb. drums)	lb.	.65	
Santomerse S	lb.	.11	/ .25
D	lb.	.41	/ .65
Santovar A	lb.	1.15	/ 1.40
Stablex A	lb.	.90	/ 1.10
B	lb.	.65	/ .90
C	lb.	.40	/ .50
Sulphur, Dispersed	lb.	.10	/ .15
No. 2	lb.	.075	/ .15
T.1. (400 lb. drums)	lb.	.40	
Tepidone	lb.	1.75	
Vulcan Colors	lb.		
Zinc oxide, dispersed	lb.	.12	/ .15

Mineral Rubber

Black Diamond	ton	25.00	
Genasco Hydrocarbon, granulated, (fact'y)	ton		
solid	ton		
Gilsonite Hydrocarbon (factory)	ton		
Hydrocarbon, hard	ton	22.00	/42.00
Parmr Grade 1	ton	25.00	/27.00
2	ton	25.00	/27.00
Pioneer	ton		
285°-300°	lb.	22.00	/42.00

Mold Lubricants

Mold Paste	lb.	.12	/ .18
Sericite	ton	65.00	/75.00
Soapbark	lb.		
Soapstone	ton	25.00	/35.00

Oil Resistant

AXF	lb.	.40	/ .45

Reenforcers

Carbon Black			
Aerfloted Arrow Specification Black	lb.		
Arrow Compact Granulized Carbon Black	lb.		
"Certified" Heavy Compressed, Cabot	lb.		
Spheron	lb.		
Continental Dustless, c.l.	lb.	.0275/	.0375
Compressed c.l.	lb.	.0275/	.0375
Uncompressed, c.l.	lb.	.0275/	.0375
Disperso, c.l.	lb.	.0275/	.0375
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	lb.	.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Excello, c.l., f.o.b. Gulf ports	lb.	.0275/	.0475
delivered New York	lb.	.0375/	.0575
l.c.l., delivered New York	lb.	.0625/	.07
Fumonex, c.l., f.o.b. works	lb.	.03	
ex-warehouse	lb.	.045	
Gastex	lb.	.03	/ .07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	$0.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Kosmobile 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0275	
c.l., delivered New York.	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
MICRONEX Beads, c.l., f.o.b. Gulf ports	lb.	.0275	
c.l., delivered, New York	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Mark II, c.l., f.o.b. Gulf ports	lb.	.0275	
c.l., delivered, New York	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Standard, c.l., f.o.b. Gulf ports	lb.	.0275	
c.l., delivered, New York	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
W-5, c.l., f.o.b., Gulf ports	lb.	.0275	
c.l., delivered, New York	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
W-6, c.l., f.o.b., Gulf ports	lb.	.0275	
c.l., delivered, New York	lb.	.0375	
local stock, bags, delivered	lb.	.0625	
Paradene No. 2 (drums)	lb.	.04	
Pelletex	lb.	.03	/$0.07
Supreme, c.l., f.o.b. Gulf ports	lb.	.0275/	.0475
delivered New York	lb.	.0375/	.0575
l.c.l. delivered New York	lb.	.0625/	.07
"WYEX BLACK"	lb.		

Clays

Aerfloted Paragon (50 lb. bags)	ton	9.50	/22.00
Suprex (50 lb. bags)	ton	9.50	/22.00
China	ton	17.50	/20.00
Dixie	ton	11.00	/30.00
Junior	ton	9.50	/29.00
McNamee	ton	9.50	/22.00
Par	ton	9.50	/22.00
Witco, f.o.b. Works	ton	9.50	
P-33	lb.	.0475/	.0775
Thermax	lb.	.0175/	.05
Velvetex	lb.	.022	/ .035

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Curodex 19	lb.	2.75	
188	lb.	3.50	
198	lb.	4.50	
Rodo No. 0	lb.	3.50	/ 4.00
10	lb.	4.50	/ 5.00

Rubber Substitutes

Black	lb.	.07	/ .125
Brown	lb.	.08	/ .13
White	lb.	.08	/ .135
Factice			
Amberex	lb.	.19	
Brown	lb.	.07	/ .11
Neophax A	lb.	.1025	
B	lb.	.1025	
Fac-Cel B	lb.	.13	
C	lb.	.13	
White	lb.	.08	/ .12

Softeners

Bondogen	lb.	.98	/ 1.65
Burgundy pitch	lb.	.06	
Cycline oil	gal.	.14	/ .20
Nuba resinous pitch (drums)			
Grades No. 1 and No. 2	lb.	.03	
Grade No. 3	lb.	.04	
Palm oil (Witco), c.l.	lb.	.0575	
Pine tar	gal.		
Plastogen	lb.	.0775/	.125
R-19 Resin (drums)	lb.	.10	
R-21 Resin (drums)	lb.	.10	
Reogen	lb.	.115	/ .30
Rosin oil, compounded	gal.	.40	
RPA No. 1	lb.	.65	
2	lb.	.65	
Rubtack	lb.	.10	
Tackol	lb.	.085	/ .18
Tonox D	lb.	.75	/ .85
Witco No. 20	gal.	.20	
X-1 Resinous oil (tank car)	lb.	.01	

(Continued on page 80)

CHEMISTRY and TECHNOLOGY of RUBBER

Edited by C. C. Davis and John T. Blake

TABLE OF CONTENTS

Chap.

I. Composition of Crude Rubber—*A. Van Rossem*
II. Physical Properties of Raw Rubber—*G. Stafford Whitby*
III. Chemistry and Structure of Rubber Hydrocarbon—*Harry L. Fisher and Roscoe H. Gerke*
IV. Mastication and Plasticity—*Wilfred Gallay*
V. Structure and Behavior of Rubber in Liquids—*Warren F. Busse*
VI. Theories and Phenomena of Vulcanization—*Ira Williams*
VII. Vulcanization without Sulfur—*Iwan I. Ostromislensky*
VIII. Accelerators. Their History and Use—*Sidney M. Cadwell and J. W. Temple*
IX. Theories of Acceleration—*Winfred Scott and L. B. Sebrell*
X. The Physics of Vulcanized Rubber—*W. W. Vogt*
XI. Fillers and Reinforcing Agents—*Norman A. Shepard, John N. Street and Charles R. Park*
XII. History and Use of Substances which Improve Aging—*Waldo L. Semon*
XIII. Autooxidation and Deterioration by Oxygen. Prooxygens and Antioxygens—*Charles Dufraisse*
XIV. Deterioration of Rubber by Heat, Light and Ozone—*F. Harris Cotton*
XV. The Electrical Behavior of Rubber—*Archibald T. McPherson*
XVI. Properties of Latex—*W. A. Gibbons and P. D. Brass*
XVII. Industrial Uses of Latex—*D. F. Twiss, E. W. Madge and G. W. Trobridge*
XVIII. Hard Rubber (Ebonite)—*A. R. Kemp and F. S. Malm*
XIX. Rubber Derivatives of Commercial Utility—*T. R. Dawson and P. Schidrowitz*
XX. Synthetic and Substitute Rubbers—*Thomas Midgley, Jr.*
XXI. Gutta Percha and Balata—*J. N. Dean*
XXII. Reclaimed Rubber—*George W. Miller*
XXIII. Practical Compounding—*W. F. Russell*
XXIV. Physical Testing and Specifications—*Arthur W. Carpenter*
XXV. Chemical Analysis of Rubber and Rubber Products—*R. P. Dinsmore, R. H. Seeds and H. E. Rutledge*
XXVI. Literature on the Chemistry of Rubber—*C. C. Davis*

896 pages—Profusely Illustrated—Price: $15.00

INDIA RUBBER WORLD

420 Lexington Avenue New York, N. Y.

Regular and Special Construotions of

COTTON FABRICS

Single Filling Double Filling and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Seleoted

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	June 25	July 30	Aug. 6	Aug. 13	Aug. 20
July	8.75	....	....	....	....
Aug.	....	8.58	8.39	8.09	....
Sept.	8.75	8.60	8.41	8.11	8.20
Dec.	8.83	8.70	8.49	8.21	8.35
Mar.	8.88	8.77	8.57	8.24	8.37
June	....	8.82	8.64	8.28	8.36
July	....	8.85	8.65	8.29	8.36

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures covering the past two months.

The New York spot middling price closed at 8.61¢ per pound on August 1. The price thereafter declined steadily in anticipation of the government's crop estimate and closed on August 12 at 8.27¢, or equal to the 52% of parity which makes a government loan on the crop mandatory. The closing price on August 29 was 8.30¢ per pound.

Sales at 13 southern markets totaled 98,596 bales during 20 days since August 1, against 254,990 bales for the same days one year ago. On August 8 the Federal Crop Reporting Board estimated that the U. S. cotton crop for the 1938-39 season would total 11,988,000 bales, 6,958,000 bales below last year's figure.

Consumption of all cotton in domestic mills totaled 449,511 bales during July, against 442,742 in June, according to a report of the Census Bureau.

Fabrics

The cotton textile market continued to reflect slow, but steady improvement in demand during the past month. In the face of a declining cotton market many textiles have held their price ground well. It is felt, however, that cotton textiles discounted lower price cotton some time ago. A steadily improving volume of forward sales is expected during the fall months. The sheeting market, quiet for the past several weeks, shows no immediate prospect of improvement other than that of better general sentiment in market circles. Manufacturers of raincoat fabrics report favorably on their business at the present time.

Tire fabric prices all dropped ½¢ per pound for the second consecutive month. Other fabric prices continued in general at previous levels, although a few fractional changes were listed.

New York Quotations

August 26, 1938

Drills	
38-inch 2.00-yard..... *yd.*	$0.10¾
40-inch 3.47-yard.....	.06½
50-inch 1.52-yard.....	.14½
52-inch 1.85-yard.....	.12
52-inch 1.90-yard.....	.11¼
52-inch 2.20-yard.....	.10¾
52-inch 2.50-yard.....	.09
59-inch 1.85-yard.....	.11½
Ducks	
38-inch 2.00-yard D. F..... *yd.*	.10½/.11
40-inch 1.45-yard S. F.....	.15
51½-inch 1.35-yard D. F.....	.15½
72-inch 1.05-yard D. F.....	.21½/.22
72-inch 17.21-ounce	.23¾
Mechanicals	
Hose and belting..... *lb.*	.25
Tennis	
52-inch 1.35-yard ..... *yd.*	.16⅜
Hollands	
Gold Seal and Eagle	
20-inch No. 72..... *yd.*	.09
30-inch No. 72.....	.16
40-inch No. 72.....	.18
Red Seal and Cardinal	
20-inch ..... *yd.*	.07½
30-inch	.13¾
40-inch	.15
50-inch	.24
Osnaburgs	
40-inch 2.34-yard..... *yd.*	.09¼
40-inch 2.48-yard.....	.08¾
40-inch 2.56-yard.....	.08
40-inch 3.00-yard.....	.07¼
40-inch 7-ounce part waste.....	.06¾
40-inch 10-ounce part waste....	.09
37-inch 2.42-yard.....	.09
Raincoat Fabrics	
Cotton	
Bombazine 60 x 64..... *yd.*	.07½
Plaids 60 x 48.....	.10
Surface prints 60 x 64.....	.11½
Print cloth, 38½-inch, 60 x 64..	.04¼
Sheetings, 40-inch	
48 x 48, 2.50-yard..... *yd.*	.07¼
64 x 68, 3.15-yard.....	.07
56 x 60, 3.60-yard.....	.06
44 x 40, 4.25-yard.....	.04⅝
Sheetings, 36-inch	
48 x 48, 5.00-yard..... *yd.*	.04⅜
44 x 40, 6.15-yard.....	.03
Tire Fabrics	
Builder	
17¼ ounce 60" 23/11 ply Karded peeler ..... *lb.*	.28½
Chafer	
14 ounce 60" 20/8 ply Karded peeler ..... *lb.*	.28½
9¼ ounce 60" 10/2 ply Karded peeler ..... *lb.*	.27½
Cord Fabrics	
23/5/3 Karded peeler, 1/8" cotton ..... *lb.*	.29½
15/3/3 Karded peeler, 1/8" cotton ..... *lb.*	.27½
23/5/3 Karded peeler, 1¼" cotton ..... *lb.*	.35
23/5/3 Combed Egyptian.... *lb.*	.48½
Leno Breaker	
8¼ ounce and 10¼ ounce 60" Karded peeler..... *lb.*	.30½

N. Y. Outside Market

(*Continued from page* 71)

for the year, on August 24. On August 29 the spot closing price was 16⅞¢ per pound.

The week-end closing prices on No. 1 ribbed smoked sheets follow; July 30, 16⅛¢; August 6, 16¢; August 13, 15⅛; August 20, 16¼; August 27, 16⅝.

New Publications

(*Continued from page* 65)

Price Charts. St. Joseph Lead Co., 250 Park Ave., New York, N. Y. The company recently completed the assembly of data and the preparation of these two graphs showing from 1910 to mid-1938 the price of lead-free zinc oxide and a number of other related commodities. Plotted on one chart are the price (in cents per pound) curves of pig lead, basic carbonate white lead, basic sulphate white lead, red lead, basic carbonate white lead in oil, linseed oil, and China wood oil; while the other graph shows the price fluctuations of slab zinc, lead-free zinc oxide, 35% leaded zinc oxide, Green Seal zinc oxide, zinc sulphide, lithopone, titanium dioxide, titanium dioxide barium base, gas black, and rubber (smoked sheets).

"Camachine 40-4B for Quantity Production of Bandages." Cameron Machine Co., 61 Poplar St., Brooklyn, N. Y. 4 pages. The advantages of Camachine 40-4B for the semi-automatic slitting, measuring, and rolling of bandages are discussed in this folder. The score-cut method of slitting, used in this machine, is discussed in reference to cutting bandages.

"Synthetic Organic Chemicals." Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. 80 pages. The ninth edition of this booklet contains specifications, properties, and uses of the firm's 105 industrial organic chemicals. The properties of 29 new chemicals which have become commercially available since the publication of the last issue are included as well as a new section on "Tergitol" penetrants. The solubility table has been augmented to include data on 71 solvents, and a new column indicating their solvent power for rubber has been inserted.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czechoslovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1936	475,500	62,700	14,400	9,600	27,900	8,800	56,800	71,800	16,000	61,700	31,000	64,600	831,300
1937	592,528	137,351	19,257	14,969	36,087	13,063	59,959	98,170	23,980	62,205	30,462	67,745	1,110,856
1938													
Jan.	45,596	17,811	617	1,258	1,789	1,102	4,780	6,314	1,809	4,935	693	5,292	89,643
Feb.	40,977	19,149	621	974	615	1,771	5,420	6,959	2,000	3,173	2,341	5,432	86,788
Mar.	42,075	18,134	1,084	961	2,123	1,323	4,823	10,768	1,365	6,222	2,162	5,486	94,304
Apr.	31,870	16,572	647	904	999	920	5,721	6,497	2,397	5,456	4,281	5,645	79,990
May	27,809	17,783	1,087	1,137	2,545	957	5,249	9,595	2,422	3,328	2,000*	6,460	77,264

*Estimated. †U. K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

MOST FABRIC PROBLEMS CAN BE SOLVED THROUGH INTELLIGENT COOPERATION ON *Special Specifications*

WE WELCOME the opportunity of working with you on any fabric problem. Our engineers have been able to help materially in the development of special fabrics to meet particular requirements in the rubber industry.

In addition to the usual constructions of hose and belting ducks, sheetings, osnaburgs and aeronautical fabrics, regularly produced and supplied to the rubber industry by our 17 modern mills, we can offer you on special fabrics the complete facilities of one of the world's largest cotton textile organizations. These include up-to-the-minute laboratory and research facilities, modern production facilities and the technical experience of a staff of cotton textile engineers who have had long experience in cooperating with rubber engineers to develop cotton fabrics built to their special specifications.

WELLINGTON SEARS COMPANY

65 Worth Street, New York, N. Y.

BOSTON • CHICAGO • DETROIT • PHILADELPHIA • ATLANTA • ST. LOUIS • NEW ORLEANS • LOS ANGELES • SAN FRANCISCO

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs. Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,600	1,044,195	538,028
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,135,030	1,093,916	639,025
1938									
January ...	42,135	29,429	274,581	57,356	62,108	48,494	80,282	**70,019	a634,330
February...	43,930	23,868	294,338	47,459	71,516	46,241	81,043	61,003	a653,791
March	35,967	30,487	299,172	41,882	76,617	50,797	81,531	78,286	a670,332
April	30,807	27,984	301,436	39,071	82,754	40,614	86,412	70,539	a668,440
May	27,410	28,947	299,720	32,859	87,215	40,598	64,498	74,723	a653,740
June	26,011	30,629	294,566	32,079	92,312	44,729	70,986	72,821	.....
July	22,918	32,209	284,914	40,400	.....	.....	.....	.....	.....

* Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. **Not including additional absorption from U.K. manufacturers' stocks for any month during 1937. The figure will be included in yearly total. *a* Japan stocks not included.

CRUDE rubber consumption by United States manufacturers in July is estimated at 32,209 long tons, against 30,629 long tons during June, a 5.2% increase, but 26.3% under the 43,703 (revised) long tons consumed July a year ago, according to R.M.A. statistics.

Gross imports of crude rubber for July are reported to be 22,918 long tons, 11.9% under the June figure of 26,011 long tons and 41.4% under the 39,108 long tons imported in July, 1937.

Total domestic stocks of crude rubber on hand July 31 are set at 284,914 long tons, against June 30 stocks of 294,566 long tons and 167,094 long tons on hand July 31, 1937.

Crude rubber afloat to United States ports as of July 31 is estimated at 40,400 long tons, compared with 32,079 long tons afloat on June 30 and 75,779 long tons afloat on July 31, 1937.

RUBBER SCRAP

THE demand for scrap rubber during August showed no noticeable improvement over the preceding month. However, in company with other rubber interests, scrap dealers expect a definite increase in activity in the fall. With reclaim stocks still declining and with production of reclaim running under consumption, basic market conditions are favorable toward a renewal of activity.

In the mechanicals group, mixed black scrap and air brake hose grades declined in price; mixed mechanicals advanced; and garden hose, previously quoted at $10 to $10.50 per ton, is now $10 to $11 per ton. Hard rubber scrap receded ½¢ per pound; while all other scrap grades remained steady at last month's quotations.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)
August 23, 1938

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01 /$0.01⅛
Colored	lb.	.00¾/ .00⅞
Untrimmed arctics	lb.	.00¾/ .00⅞
Inner Tubes		
No. 1, floating	lb.	.08½/ .09
No. 2, compound	lb.	.04 / .04¼
Red	lb.	.04 / .04¼
Mixed tubes	lb.	.03¾/ .03⅞
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	11.25 /12.00
Beadless	ton	14.50 /15.50
Auto tire carcass	ton	17.00 /18.00
Black auto peelings	ton	17.50 /19.00
Solid		
Clean mixed truck	ton	25.00 /26.00
Light gravity	ton	33.00 /34.00
Mechanicals		
Mixed black scrap	ton	15.00 /18.00
Hose, air brake	ton	18.00 /19.00
Garden, rubber covered	ton	10.00 /11.00
Steam and water, soft	ton	10.00 /10.50
No. 1 red	lb.	.02¾/ .03
No. 2 red	lb.	.01⅞/ .02¼
White druggists' sundries	lb.	.03¾/ .04
Mixed mechanicals	lb.	.01½/ .02
White mechanicals	lb.	.03½/ .03¾
Hard Rubber		
No. 1 hard rubber	lb.	.11¼/ .11½

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1936	150,571	141,486	24.6	19,000	7,085
1937	185,033	162,000	29.8	28,800	13,233
1938					
Jan.	7,698	6,940	23.6	28,900	658
Feb.	6,198	7,141	29.9	27,487	470
Mar.	6,875	8,471	27.8	25,432	459
Apr.	6,399	7,480	26.7	23,339	426
May	6,866	8,009	27.7	22,275	550
June	7,584	8,274	27.0	21,040	658
July	7,109	8,273	25.7	18,832	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

ACCORDING to R.M.A. figures, July reclaimed rubber consumption is estimated at 8,273 long tons, approximately the same as the June figure; production, 7,109 long tons; as of July 31, stocks on hand were 18,832 long tons. The demand for reclaim during August was only slightly improved over that of the preceding month. With an anticipated increase in equipment tire production as a result of new car models, reclaimers expect a definite increase in business during the fall months.

The market is steady, and all grades of reclaim remain unchanged.

New York Quotations

August 23, 1938

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	6¾/ 7
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
No. 1 Floating	1.00 - 12	/12¾
Compound	1.10-1.20	8 / 8¼
Red Tube	1.15-1.30	8 / 8¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4¼/ 5
White	1.35-1.50	11½/12

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

London and Liverpool Stocks

Week Ended	Tons London	Tons Liverpool
July 30	62,182	32,864
August 6	62,855	33,061
August 13	63,918	33,538
August 20	64,496	34,871

Tire Production Statistics

	Pneumatic Casings Inventory	Production	Shipments
1936	11,114,399	58,116,349	55,362,739
1937	10,767,799	55,284,415	55,466,329
1938			
Jan.	10,987,967	2,776,046	2,500,148
Feb.	10,833,036	2,238,167	2,359,098
Mar.	10,819,552	2,792,440	2,890,749
Apr.	10,316,774	2,737,235	3,272,875
May	9,855,360	2,723,524	3,405,036
June	8,762,674	3,109,170	4,066,918
July	8,201,415	3,352,601	3,947,431

	Inner Tubes Inventory	Production	Shipments
1936	10,985,273	57,247,553	54,624,321
1937	10,235,517	51,986,167	52,376,657
1938			
Jan.	10,164,141	2,417,920	2,423,856
Feb.	10,161,093	2,132,013	2,127,260
Mar.	10,129,854	2,474,821	2,544,480
Apr.	9,524,959	2,199,116	2,781,908
May	9,010,245	2,260,841	2,889,799
June	8,107,626	2,717,316	3,629,224
July	7,511,679	2,784,418	3,356,929

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)
Allow nine words for keyed address.		*Replies forwarded without charge.*

SITUATIONS WANTED

GENERAL FOREMAN: WITH 18 YEARS' EXPERIENCE IN coated textiles. Complete knowledge of the manufacture of upholstery cloth for automotive industry, furniture trade, and baby carriage industry. Address Box No. 994, Care of INDIA RUBBER WORLD.

MECHANICAL ENGINEER, UNIVERSITY GRADUATE, FIFTEEN years' broad experience; executive engineering, development work, and factory equipping and maintenance with both large and small rubber manufacturers, desires permanent connection. Address Box No. 995, care of INDIA RUBBER WORLD.

RUBBER CHEMIST. A.B. 1928 MIDWESTERN UNIVERSITY. Ten years' experience in reclaiming, compounding, and factory management. Married, 32 years old, Protestant. Record of training and references will be submitted on request. Available immediately. Address Box No. 996, care of INDIA RUBBER WORLD.

FACTORY MANAGER AND SUPERINTENDENT—TECHNICALLY trained with over 20 years' practical experience, is desirous of making a change. Thoroughly understands manufacture of pyroxylin coatings, hospital sheeting, raincoating, flock lining and quarter lining, and any item in proofing line, calender and spread. Does own compounding of rubber and formulation of pyroxylin dopes. Guarantees to lower any manufacturing costs. Will go anywhere. Address Box No. 997, care of INDIA RUBBER WORLD.

SUPERINTENDENT, CHEMIST, DEVELOPMENT ENGINEER, PRODUCTION manager desires change. Competent to compound for mechanical rubber goods and synthetic rubber or sponge rubber products. Capable of estimating factory costs and drawing up manufacturing specifications. Eighteen years' active experience. University education. Age 39. Address Box No. 1000, care of INDIA RUBBER WORLD.

SUPERINTENDENT OR ASSISTANT DESIRES CONNECTION with small progressive company. Intimate with all manufacturing details of following lines: belting, packing, hose, rubber-covered rolls, sponge rubber, tape, soles, heels, flooring, cut goods, molded and extruded hard and soft rubber, erasers, and druggists' sundries. Competent to train inexperienced help and develop formulas and new items. Best of references. Address Box No. 1003, care of INDIA RUBBER WORLD.

LATEX CHEMIST—CHEMICAL ENGINEER, B.S. 1934—3 YEARS' experience adhesives, thread, some dipping, including laboratory research and production. References. Address Box No. 1006, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.
Chemists—Engineers
Every form of Chemical Service
305 Washington Street Brooklyn, N. Y.

EDWARD FOX
Latex Technologist • Research • Development
153 CENTRE STREET NEW YORK, N. Y.

MECHANICAL
MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

SITUATIONS OPEN

EXECUTIVES, IF YOU ARE NOW EARNING OVER $2,500 YEARLY, can prove it and seek a promotion or change, our personal, strictly confidential service, hiding your identity, locates suitable higher-bracket salaried openings in your behalf. Write P. O. Box 6118, Washington, D. C.

CHEMICAL ENGINEER FOR RESEARCH DEPARTMENT WITH at least seven years' experience in the mechanical rubber goods or hard rubber industry. Location—New Jersey. Address Box No. 998, care of INDIA RUBBER WORLD.

WANTED: FACTORY MANAGER FOR MOLDED RUBBER GOODS FACTORY. Experienced modern production methods and cost control. Ability to train and direct men. Knowledge machinery and maintenance essential. Give complete information: education, experience, age, salary, references. Replies held confidential. Address Box No. 1001, care of INDIA RUBBER WORLD.

WANTED, BY ESTABLISHED EASTERN RUBBER MANUFACturer: a responsible, energetic chemist or chemical engineer not over thirty years of age, with several years' experience in manufacturing sponge rubber products. State in detail qualifications, salary desired, and enclose photograph. Our technical men know about this advertisement. Address Box No. 1002, care of INDIA RUBBER WORLD.

MAN WITH PRACTICAL EXPERIENCE IN MILLING, CALENDERing, vulcanizing sheet stock. Preferably with experience in making cut rubber thread. Should have mechanical ability. Send full details experience. Address Box No. 1004, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

FOR SALE: STEEL CONCRETE FULLY EQUIPPED TIRE PLANT suitable for mechanical goods. Experienced labor available. L. M. Kyes, East Palestine, Ohio.

FOR SALE: PROPHYLACTIC FACTORY, LIQUID LATEX, MAchineries ready for production in Ohio. Address Box No. 1007, care of INDIA RUBBER WORLD.

CALENDER SHELLS
ANY DIAMETER, ANY LENGTH
The W. F. Gammeter Co., Cadiz, Ohio

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

TERKELSEN MACHINE COMPANY
Manufacturers of
SPIRAL WRAPPING MACHINES
for
COILS OF STEEL, WIRE AND HOSE
Write for Particulars
325 A Street Boston, Mass.

GUAYULE RUBBER
Washed and Dry, Ready for Compounding
PLANTATION RUBBER
From Our Own Estates in Sumatra
CONTINENTAL RUBBER COMPANY OF NEW YORK
745 Fifth Avenue New York

(*Advertisements continued on page* 81)

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Export Opportunities

No.	Commodity	City and Country
†7,123	Storage batteries	Zeist, Holland
‡7,125	Automobile accessories	London, England
‡7,138	Insulating materials	Toronto, Canada
*7,151	Hose	Buenos Aires, Argentina
*7,174	Tires and tubes	Tangoon, Burma
*7,206	Automatic accessories and parts	Toronto, Canada
†7,209	Carbon black	Lodz, Poland
‡7,226	Office supplies	Zanzibar, East Africa
*7,230	Rubber chemicals	Basel, Switzerland
*7,244	Stationery supplies	Manila, Philippine Islands
*7,248	Truck tire repair molds and equipment and airplane tire repairing machinery	Warsaw, Poland
†7.255	Rubber balloon machinery and crude rubber.	Sofia, Bulgaria
*7,261	Bathing caps, gloves, aprons, sheets, stair treads, water bottles, ice bags, sprays, hose, toys, footwear, and sport articles	Oslo, Norway
*7,262	Sanitary belts	Singapore, Straits Settlements
†7,269	Office and school supplies	Antwerp, Belgium
*7,274	Sporting goods	Lima, Peru
§7,280	V-Type belting	Wavre, Belgium
*7,291	Automobile accessories and parts	Mexico City, Mexico
*7,292	Rubber bands and school supplies	Korcha, Albania
*7,307	Toys and novelties	Habana, Cuba
*7,321	Surgical rubber goods.	Rio de Janeiro, Brazil
†7.338	Retread tires	Panama City, Panama
*7,340	Balloons and toys	Rio de Janeiro, Brazil
*7,342	Toys	Habana, Cuba
*7,346	Golf equipment	Calcutta, India
†7,355	Elastic cotton stockinet.	Winnipeg, Canada
*7,388	Surgical rubber goods, rubber thread, and crude rubber	Athens, Greece
‡7,407	Rubberized fabric	The Hague, Netherlands
†7,429	Balloons	Sofia, Bulgaria
‡7,430	Toys	Paris, France
*7,440	Rubber goods	Alexandria, Egypt
*7,441	Corsets	Rio de Janeiro, Brazil
*7,455	Rubber chemicals	Utrecht, Netherlands
*7,459	Rubber chemicals	Copenhagen, Denmark
*7,464	Automobile accessories.	London, England
*7,510	Elastic webbing	Amsterdam, Netherlands
†7,527	Surgical and medical goods	Tel-Aviv, Palestine

Import Opportunities

§ 305	Latex	Singapore, Straits Settlements

*Agency. †Purchase. ‡Purchase and agency. §Exclusive agency. ¶Sale.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for July, 1938:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	9,957	534
United States	17,061	273
Continent of Europe	11,181	479
British possessions	2,392	63
Japan	1,023	5
Other countries	708	13
Totals	42,322	1,367

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	7,543	244
Dutch Borneo	2,072	3
Java and other Dutch Islands	277	..
Sarawak	2,220	8
British Borneo	408	25
Burma	391	..
Siam	3,613	1,234
French Indo-China	410	150
Other countries	99	16
Totals	17,033	1,680

New Pliofilm Has Many Uses

METAL SHEEN, a new form of Pliofilm with a metallic appearance, is being used for raincapes, shower curtains, bridge table covers, etc. The new Pliofilm is opaque with a lustrous sheen to give an iridescent effect and comes in five colors: medium blue, light green, silver, copper, and rose. Richards, Boggs & King, Inc.

New York Quotations

(*Continued from page 74*)

Solvents

Beta-Trichlorethane	*gal.*	
Carbon bisulphide	*lb.*	
tetrachloride	*lb.*	
Industrial 90% benzol (tank car)	*gal.*	.16
Skellysolve	*gal.*	

Stabilizers for Cure

Laurex, ton lots	*lb.*	.13 / .15
Stearex B	*lb.*	.105 / .115
Beads	*lb.*	.09 / .10
Stearic acid, single pressed	*lb.*	.105 / .115
Stearite	100 *lbs.*	9.00
Zinc stearate	*lb.*	.23

Synthetic Rubber

Neoprene Type E	*lb.*	.65
G	*lb.*	.80
H	*lb.*	.80
M	*lb.*	.75
Latex Type 50	*lb.*	.35
55	*lb.*	.35
56	*lb.*	.35
"Thiokol" A	*lb.*	.35
Coating materials	*gal.*	2.50 / 5.00
DX	*lb.*	.55
Molding Powder	*lb.*	.50 / .75

Varnish

Shoe	*gal.*	1.45

Vulcanizing Ingredients

Sulphur		
Chloride, drums	*lb.*	.035 / .04
Rubber	100 *lbs.*	2.65
Telloy	*lb.*	1.75 / 2.00
Vandex	*lb.*	1.75 / 2.00

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	*lb.*	.37½
2 N.C.	*lb.*	.39½
3 N.C.	*lb.*	.37½
1 Yellow	*lb.*	.4575
2	*lb.*	.4425
Montan, crude	*lb.*	.11

ELEVATOR PRECAUTIONS. (1) When an elevator is installed in the hatchway for temporary operation during construction to hoist men or material, it is well to take the same precautions which are taken in a finished elevator. (2) Never overload an elevator. (3) Don't talk to the elevator operator. *News Letter*, Rubber Section, National Safety Council.

U. S. Crude and Waste Rubber Imports for 1938

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1938	Totals 1937	Balata	Miscellaneous	Waste
Jan. *tons*	39,744	1,259	411	177	6	538	42,135	32,820	41	526	8
Feb.	41,709	1,400	453	150	..	218	43,930	43,289	35	808	22
Mar.	34,252	861	371	278	..	205	35,967	52,039	37	555	93
Apr.	29,662	690	324	...	1	130	30,807	35,850	73	1,046	33
May	25,967	696	195	326	1	225	27,410	50,840	32	647	5
June	25,141	640	20	60	..	150	26,011	48,956	35	901	23
July	21,883	656	64	52	9	254	22,918	39,108	57	828	12
Total 7 mos., 1938 *tons*	218,358	6,202	1,838	1,043	17	1,720	229,178	.....	310	5,311	196
Total 7 mos., 1937 *tons*	282,705	13,712	4,431	499	88	1,467	.....	302,902	202	4,896	2,638

Compiled from The Rubber Manufacturers Association, Inc., statistics.

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Philippines Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1936	353,700	309,600	49,700	8,600	5,800	8,200	21,000	34,600	40,800	832,000	1,600*	6,100	14,700	1,200	855,600
1937	469,960	431,646	70,359	9,778	7,232	13,213	25,922	35,551	43,374	1,107,035	1,617*	7,678	16,008	2,692	1,135,030
1938															
Jan.	30,998	26,468	5,222	841	538	1,307	3,485	2,897	6,088	77,844	138	824	938	538	80,282
Feb.	37,166	27,366	5,216	639	770	918	8	3,266	3,070	78,419	125	641	1,640	218	81,043
Mar.	33,567	31,268	3,834	532	703	853	1,564	2,837	3,213	78,371	159	968	1,883	150	81,531
Apr.	44,744	28,482	1,951	485	842	1,158	1,728	1,583	3,647	84,620	201	318	1,085	188	86,412
May	28,011	22,033	2,833	909	561	815	1,648	2,507	3,118	62,435	120	554	1,160	229	64,498
June	28,048	24,400	3,691	632	693	643	2,441	3,906	4,773	69,227	150*	600*	809	200*	70,986

*Estimated. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

CONSOLIDATED OFFERS: 1-6″ ALLEN TUBER, motor driven; 2-Birmingham 22″x20″x60″ Mills; 3-42″ Thropp Mills, motor driven; 6-30″ x30″ Hydraulic Presses with 16″ rams; 4-24″x24″ Hydraulic Presses with 18″ rams. We Buy and Sell from a Single Item to a Complete Plant. **CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.**

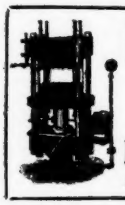
MACHINERY AND SUPPLIES WANTED

WANTED: MANUFACTURER REQUIRES 22″ x 60″ CALENDER made since 1924. Submit maker's name and serial number. Describe condition and completeness. Address Box No. 999, care of INDIA RUBBER WORLD.

WANTED FOR IMMEDIATE PURCHASE ONE THREE- OR FOUR-roll 42- or 48-inch calender with gear reduction drive. Calender to be used for rubberizing fine fabrics; rolls must be perfect, must be complete and in excellent working condition, stand inspection. Replies please give full information and price including packing for export to Mexico City. Address Box No. 1005, care of INDIA RUBBER WORLD.

MISCELLANEOUS

METAL BOND CEMENT APPLIED COLD WILL unite vulcanized rubber to metal, wood, or other surfaces with which it is usually difficult to secure a good bond. KENNETH R. ELWELL, La Grange, Ill.



PLASTICS MOLDING PRESSES

Plain or Semi-automatic—Any Size or pressure—Pumps, Valves, etc.

Dunning & Boschert Press Co., Inc.

336 W. WATER ST. SYRACUSE, N. Y.

CALENDER SHELLS, MANDRELS

and

AIRBAG BUFFING MACHINERY

The National Sherardizing & Machine Co.

HARTFORD, CONN.

CHICAGO MOLD & MACHINE COMPANY

Manufacturers of

Molds for Rubber Products

Specializing in Weather Strip Molds

4211 West Lake Street CHICAGO, ILL.

Telephone Nevada 5141

COLORS for RUBBER

Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides

Reinforcing Fillers and Inerts

C. K. WILLIAMS & CO.

EASTON, PA.

BARBER *Genasco* (M.R.) Hydrocarbon

(SOLID OR GRANULATED)

A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory. Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.

BARBER ASPHALT CORPORATION

New York Philadelphia Madison, Ill. Chicago

GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS

HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

319-323 FRELINGHUYSEN AVE. CABLE "URME" NEWARK, N. J.

Thoroughly Rebuilt and Guaranteed

RUBBER MILL MACHINERY

We Operate Our Own Machine Shops

Accumulators
Calenders
Cutting Machines
Spreaders
Vulcanizers
Tubers

Mills
Pumps
Mixers
Churns
Motors
Presses

Offices and Warehouses
336 Whitehead Rd.
TRENTON, N. J.

Adams, Arch and Union Sts.
AKRON, OHIO

European Office and Representative:
Mr. Andre Berjonneau, No. 33 Blvd. des Batignolles, 33, Paris (VIII) France.

L. ALBERT & SON

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	May, 1938 Quantity	May, 1938 Value	Five Months Ended May, 1938 Quantity	Five Months Ended May, 1938 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids)..... *lb.*	1,968,576	$279,502	13,061,399	$1,958,161
Jelutong or pontianak.... *lb.*	2,015,465	274,652	9,500,221	1,538,202
Balata ..... *lb.*	65,487	8,806	492,546	74,352
Gutta percha ..... *lb.*	25,055	4,463	338,870	56,584
Guayule ..... *lb.*	512,654	61,756	2,962,708	361,479
Siak ..... *lb.*	22,413	2,739	104,738	12,240
Scrap and reclaimed..... *lb.*	409,117	2,298	1,928,394	26,326
Totals	5,108,767	$634,216	28,388,876	$4,027,344
Misc. rubber (above), 1,000 *lbs.*	5,108	$634,216	28,388	$4,027,344
Crude rubber.....1,000 *lbs.*	60,994	8,010,250	410,450	59,216,949
Totals .....1,000 *lbs.*	66,102	$8,735,466	438,838	$63,244,293
Chicle, crude ..... *lb.*	590,314	$184,369	5,395,711	$1,706,851
MANUFACTURED—*Dutiable*				
Rubber tires ..... *no.*	2,526	$17,364	8,033	$36,959
Rubber boots, shoes, and overshoes ..... *prs.*	5,079	934	26,844	4,600
Rubber soled footwear with fabric uppers ..... *prs.*	65,722	12,005	319,117	74,558
Golf balls ..... *no.*	61,934	7,089	355,185	33,948
Lawn tennis balls..... *no.*	47,158	4,672	350,906	32,974
Other rubber balls..... *no.*	111,306	3,568	1,468,944	53,923
Other rubber toys ..... *lb.*	26,392	3,881	173,134	26,101
Hard rubber combs ..... *no.*	56,324	4,164	208,604	14,329
Other manufactures of hard rubber	.....	1,638	.....	7,613
Friction or insulating tape *lb.*	3,500	189	42,975	2,379
Belts, hose, packing, and insulating material	.....	5,870	.....	33,417
Druggists' sundries of soft rubber	.....	2,102	.....	28,297
Inflatable swimming belts, floats, etc. ..... *no.*	59,550	5,074	342,357	27,306
Other rubber and gutta percha manufactures.... *lb.*	58,423	13,831	393,159	93,027
Totals	.....	$82,381	.....	$469,431

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ..... *lb.*	1,182,251	$167,831	4,790,018	$695,307
Balata ..... *lb.*	78,764	21,657	199,617	59,254
Other rubber, rubber substitutes and scrap..... *lb.*	.....	.....	92,047	10,993
Rubber manufactures (including toys)	.....	269	.....	5,732
Totals	.....	$189,757	.....	$771,286

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ..... *lb.*	1,232,036	$63,509	5,734,685	$329,505
Scrap ..... *lb.*	5,338,576	77,976	26,585,209	420,891
Cements ..... *gal.*	20,056	17,510	172,034	154,224
Rubberized auto cloth..*sq. yd.*	16,410	9,217	141,275	65,123
Other rubberized piece goods and hospital sheeting..*sq. yd.*	165,232	65,071	966,851	384,355
Boots ..... *prs.*	6,121	13,444	47,785	103,729
Shoes ..... *prs.*	21,708	9,687	126,482	58,467
Canvas shoes with rubber soles ..... *prs.*	67,486	45,597	239,735	160,039
Heels ..... *doz. prs.*	42,734	22,826	190,734	97,922
Soling and top lift sheets.*lb.*	49,274	9,228	162,790	30,527
Gloves and mittens..*doz. prs.*	6,942	13,651	40,528	81,908
Water bottles and fountain syringes ..... *no.*	16,738	6,125	90,427	30,049
Other druggists' sundries....	.....	46,619	.....	231,211
Gum rubber clothing....*doz.*	40,249	61,210	127,093	255,326
Balloons ..... *gross*	44,462	31,046	191,379	128,786
Toys and balls.....	.....	7,571	.....	44,410
Bathing caps ..... *doz.*	4,003	7,580	23,561	48,625
Bands ..... *lb.*	20,399	7,501	108,179	42,504
Erasers ..... *lb.*	29,800	17,966	136,144	78,421
Hard rubber goods				
Electrical battery boxes..*no.*	17,341	12,165	99,223	68,025
Other electrical ..... *lb.*	22,950	4,388	171,453	36,250
Combs, finished..... *doz.*	15,612	8,151	96,507	39,626
Other hard rubber goods..	.....	12,406	.....	81,920
Tires				
Truck and bus casings..*no.*	20,260	387,088	99,091	1,947,711
Other auto casings.....*no.*	49,035	531,694	256,430	2,569,662
Tubes, auto .....*no.*	40,311	75,993	228,109	374,605
Other casings and tubes.*no.*	6,962	43,998	32,255	254,502
Solid tires for automobiles and motor trucks....*no.*	190	6,278	1,438	40,669
Other solid tires.....*lb.*	30,014	5,112	284,405	50,341
Tire sundries and repair materials	.....	44,437	.....	283,339
Rubber and friction tape..*lb.*	44,091	17,868	286,019	87,483
Fan belts for automobiles.*lb.*	54,708	30,469	212,914	112,421
Other rubber and balata belts ..... *lb.*	185,902	97,273	1,146,254	590,940
Garden hose ..... *lb.*	60,937	11,248	274,301	52,799
Other hose and tubing....*lb.*	293,074	115,641	1,793,293	665,066
Packing ..... *lb.*	87,517	43,377	447,190	220,866
Mats, matting, flooring, and tiling ..... *lb.*	99,485	13,696	395,782	60,155
Thread ..... *lb.*	47,170	31,244	182,343	125,938
Gutta percha manufactures.*lb.*	75,205	24,640	331,149	105,048
Other rubber manufactures..	.....	109,351	.....	522,818
Totals	.....	$2,159,851	.....	$11,036,206

Rubber Goods Production Statistics

	1938 May	1937 May
TIRES AND TUBES		
Pneumatic casings		
Production ..... *thousands*	2,726	5,352
Shipments, total ..... *thousands*	3,370	5,375
Domestic ..... *thousands*	*	5,281
Stocks, end of month..... *thousands*	9,747	12,592
Inner Tubes		
Production ..... *thousands*	2,230	4,956
Shipments, total ..... *thousands*	2,843	5,028
Domestic ..... *thousands*	*	4,959
Stocks, end of month..... *thousands*	9,010	12,107
Raw material consumed		
Fabrics ..... *thous. of lbs.*	....	23,268
MISCELLANEOUS PRODUCTS		
Single and double texture proofed fabrics		
Production ..... *thous. of yds.*	2,364	3,991
Rubber and canvas footwear		
Production, total ..... *thous. of prs.*	3,811	6,734
Tennis ..... *thous. of prs.*	*	3,635
Waterproof ..... *thous. of prs.*	*	3,098
Shipments, total ..... *thous. of prs.*	3,648	4,784
Tennis ..... *thous. of prs.*	*	3,778
Waterproof ..... *thous. of prs.*	*	1,006
Shipments, domestic, total..... *thous. of prs.*	*	4,735
Tennis ..... *thous. of prs.*	*	3,736
Waterproof ..... *thous. of prs.*	*	999
Stocks, total, end of month..... *thous. of prs.*	20,563	21,116
Tennis ..... *thous. of prs.*	*	5,071
Waterproof ..... *thous. of prs.*	*	16,045

*Data no longer available.

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2495	Manufacturer of extruded rubber products.
2496	Supplier of camelback.
2497	Manufacturer of Stik-bak [Stick-back (?)], a rubber backed cloth for attaching rubber to metal, etc.
2498	Manufacturer of hand rubber punching dies.
2499	Manufacturer of hard wood punching blocks and composition blocks or pads.
2500	Manufacturer of "Compol," rubber cement for attaching soles to shoes.
2501	Suppliers of S D C, Z P D, and Z D C.
2502	Supplier of Malacca abrasive plastic rubber.
2503	Supplier of Malacca F Primer.
2504	Supplier of light rose neutral oil as a softening agent for rubber.
2505	Manufacturer of continuous lengths of sponge rubber.
2506	Supplier of "Hydrafal."
2507	Manufacturer of machine to remove skin formed when sponge rubber is vulcanized.

Imports by Customs Districts

	June, 1938 *Crude Rubber Pounds	June, 1938 *Crude Rubber Value	June, 1937 *Crude Rubber Pounds	June, 1937 *Crude Rubber Value
Massachusetts	6,066,154	$796,743	11,307,066	$2,460,829
Buffalo	112,000	11,356	.....	.....
New York	44,669,649	5,469,407	80,778,359	17,213,564
Philadelphia	1,429,306	146,659	4,124,364	904,676
Maryland	894,052	98,284	3,094,042	695,298
Mobile	112,000	12,403	1,732,283	397,253
New Orleans	4,799,665	618,698	934,224	243,284
Los Angeles	1,177,645	141,682	8,463,549	1,708,282
San Francisco	833,783	110,721	524,322	117,511
Oregon	.....	.....	22,400	4,704
Michigan	.....	.....	992	193
Ohio	.....	.....	412,606	88,924
Colorado	.....	.....	112,000	18,338
Chicago	501	100	.....	.....
Totals	60,094,755	$7,406,053	111,506,207	$23,852,856

*Crude rubber including latex dry rubber content.

Principal World Auto Tire Exports[1]

Thousands

Year	United States	United Kingdom	Canada	France	Italy	Germany	Japan	Belgium	Total
1936.....	859	1,251	707	454	364	273	148	357	4,413
1937.....	1,016	1,376	863	474	471	251	193	431	5,075

[1] From "Rubber Products Foreign Trade Notes," Mar. 19, 1938, U. S. Dept. of Commerce, Washington, D. C.

NO OTHER *Swing Joint* HAS *all* THESE FEATURES

Ball Bearings.

Complete rotation without binding.

Nothing to tighten or get out of adjustment.

Dependable performance under the most severe usage.

Excellent for saturated steam service.

You get ALL of these in CHIKSAN BALL BEARING SWING JOINTS!

Write for literature.

No. 40 — 1-Way Swivel

No. 30 — 1-Way Swivel

Swing Safely with Chiksan Swing Joints!

CHIKSAN OIL TOOL CO., LTD.
FULLERTON, CALIFORNIA ☆ SHELL BUILDING, HOUSTON, TEXAS

SCOTT TESTERS
TRADE MARK

Reg. U. S. Pat. Off.

Tensile Testing Machines
for
RUBBER, TEXTILES
WIRE, SHEET
METAL, Etc.

Machines for testing abrasion, flexing, compression, fatigue or hysteresis, plasticity, and other physical characteristics.

HENRY L. SCOTT CO.
101 Blackstone St. Providence, R. I.

STANLEY

Finishing Problems

If yours is a problem in the coating of flexible rubber, leatherette, latex or molded products we welcome the opportunity of discussing it.

A staff of experienced chemists with complete scientific apparatus in a modern laboratory are qualified to study your problems from a theoretical and practical standpoint.

It is our experience in the successful formulation of lacquer coatings that has made Stanley Rubber Finishes internationally known and used.

THE STANLEY CHEMICAL CO.
EAST BERLIN, CONN.
LACQUERS — SYNTHETICS — ENAMELS — JAPANS
A subsidiary of The Stanley Works, New Britain, Connecticut

COLONIAL
One-Piece Closed End Forms
Save TIME and MONEY

THE Vitreous Porcelain closed end forms originated and made by us exclusively, are in a class by themselves.

Makers of dipped rubber goods all 'round the world have standardized on this patented type of Colonial form because they save time and money.

When you need forms for gloves or any other dipped goods, send us your blue print or sketch for our suggestions and prices.

The COLONIAL INSULATOR Co.
973 Grant Street AKRON, OHIO

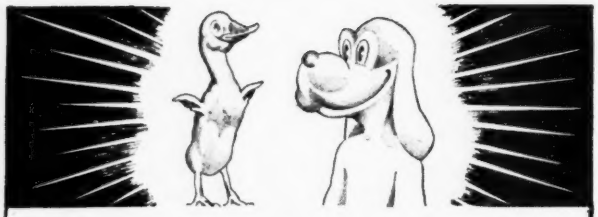
★ 1928 ★ SCRAP RUBBER · CRUDE RUBBER · HARD RUBBER DUST ★ 1938 ★

10th Anniversary

A. Schulman INC.

● AKRON, OHIO 1006 AKRON SAV. & LOAN BLDG.
● BOSTON, MASS. 738 STATLER BUILDING
● E. ST. LOUIS, ILL. 18th AND CONVERSE STS.

WAREHOUSES • AKRON, OHIO • EAST ST. LOUIS, ILLINOIS



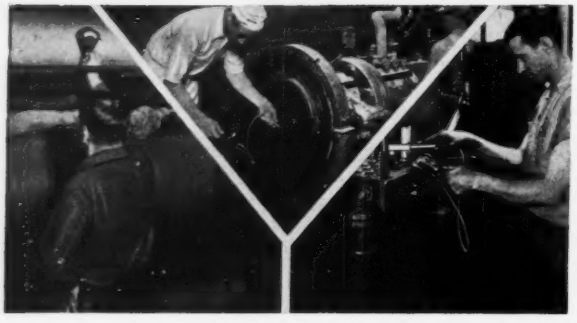
It's that finishing touch to rubber which makes the sale

FORMULA F77

Even though your product may be "tops" in quality, an inferior competing article, with a better surface finish, will be chosen by the unskilled consumer nearly every time. Increase the display value and salability of your moulded rubber goods by surfacing them with Formula F-77.

Send for a free sample can direct from

FRANKLIN RESEARCH COMPANY
Philadelphia



This COMBINATION PYROMETER IS 3 INSTRUMENTS IN 1

SURFACE-NEEDLE-MOLD

The Cambridge Combination Pyrometer has three separate thermocouples that may be interchanged in a few seconds. The Surface attachment indicates temperatures of still or moving rolls; the Mold attachment determines temperatures of mold cavities or other surfaces in plastic molding, and the Needle attachment is inserted into rubber or similar materials to indicate actual temperatures. A reliable instrument for laboratory or shop. Single purpose pyrometers also available.

Send for literature about this and other Cambridge Instruments.

CAMBRIDGE INSTRUMENT CO INC

3732 GRAND CENTRAL TERMINAL, NEW YORK

The CARTER BELL MFG CO

CARTER BELL
STANDARD
SINCE 1903
RUBBER SUBSTITUTES

150 Nassau St New York

RMP
ANTIMONY
FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

●

RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

Modernize With Black Rock Equipment

CUTTERS

For Crude and Processed Rubber, Rubber Bands, Jar Rings, Washers and Treads.

Trimming Machines
Rubber Roller Grinders
Rubber Roller Polishers
Packing and Brake Lining Calenders
Washer Stripping Machines
Goodrich Roller Gauges and Plastometers
Special Rubber Machinery

FINE BR TOOLS

Detailed Information on Request

BLACK ROCK MANUFACTURING COMPANY

Eastern Representatives for the Schuster Magnetic Gauge
175 Osborne Street Bridgeport, Conn.
Export Office: 277 Broadway, New York, N. Y.
Michigan, Indiana, Illinois, Wisconsin
Ohio and Western Pennsylvania Representative
J. C. CLINEFELTER
239 N. HIGHLAND AVENUE AKRON, OHIO

ZOPAQUE
Pure Titanium Dioxide

Acknowledged the

MOST *Effective*

of all white opacifiers!

Chemically pure, stable, inert.

Try It!

CONSTANT VIGILANCE QUALITY SERVICE

The Chemical & Pigment Company
Baltimore, Md. Collinsville, Ill.
Lithophone, Cadmium Red, Cadmolith, Titanolith, Zopaque (TiO_2)
Marshall Dill, San Francisco, California

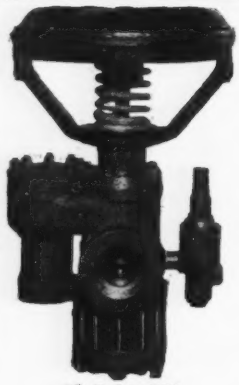
THE BEAD CHAIN LOOP *ON SLIDE FASTENERS . . .*

Wet, cold, gloved fingers readily grasp the BEAD CHAIN* loop so extensively used on slide fasteners. It is an appreciated addition to purchasers of bathing bags, rain coats, arctics and other rubber items.

BEAD CHAIN* is ideal, too, for holding caps on hot water bottles and ice bags. It revolves naturally, and cannot kink or tangle.

Our engineering department is prepared to cooperate with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

THE BEAD CHAIN MANUFACTURING CO.
* REG. U.S. PAT. OFF. 32 MT. GROVE ST., BRIDGEPORT, CONN.



3" Valve E21

THE ARISTOCRAT OF **VALVES**

SINCLAIR . . . COLLINS

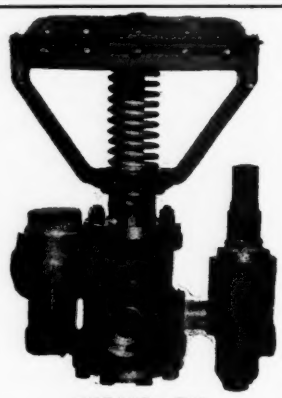
Adopted as standard for leading rubber plant equipment, after long and successful operation.

Two pressure operated valves—also single pressure control valves—in three and four ways—reverse acting—direct acting.

Write for Literature

SINCLAIR-COLLINS VALVE CO.

454 Morgan Avenue Akron, Ohio



1½" Valve D54

We Manufacture and Can Supply

RUBBER PLANT EQUIPMENT of Every Type for Every Purpose Including Special Latex Equipment

CONTINENTAL MACHINERY COMPANY

277 Broadway **New York, N. Y.**

Phone: WOrth 2-1650-1651 Cable Address: "CONTIMAC" New York

Our Motto—"Through Service We Live and As We Live We Grow"

ROBERT BADENHOP CORPORATION

•

CRUDE RUBBER

GUTTA PERCHA GUTTA SIAK

BALATA

•

WOOLWORTH BLDG. (TEL. CORTLAND 7-6920) NEW YORK, N.Y.

The New General Dual 8

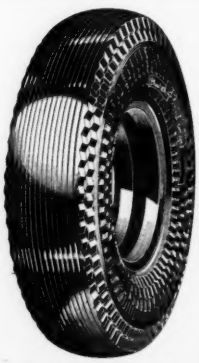
The

GENERAL

TIRE

- goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE & RUBBER CO.



The General Dual 10

CALCENE

(Reenforcing Calcium Carbonate)

Gives that desired process-ability to light mechanical goods, while improving tensile, tear and resistance to abrasion.

The Columbia Alkali Corporation
Barberton, Ohio.

DAVOL RUBBER COMPANY

feels the ethical responsibility of leadership
in the manufacture of

FINE RUBBER GOODS FOR DOCTOR, SURGEON,
DENTIST, DRUGGIST AND STATIONER

We pledge ourselves to the highest standards in underwriting their professional and business contact with the consumer.

Molded and hand-made goods to order.

DAVOL

Established 1874
Providence, Rhode Island

NEW YORK OFFICE
302 Broadway

BOSTON OFFICE
80 Boylston Street

CHICAGO OFFICE
209 South State Street

SAN FRANCISCO OFFICE
116 New Montgomery St.

Cable Address:
"DAVOL, PROVIDENCE," Western Union Code
Marconi Wireless Address—"DAVOL"
Marconi Official Wireless Telegraphic Code

QUALITY **INTEGRITY** **SERVICE**

57 YEARS WITHOUT REORGANIZATION

BELTING
Transmission — Conveyor — Elevator

HOSE
for every purpose
Water—Fire—Air—Steam

HOME RUBBER CO. TRENTON, N. J. STEAM NEVER BURN BLOW OUT PACKING. CHICAGO NEW YORK

PACKING
Sheet & Rod Packings
for every condition

Mechanical Specialties of Every Description

HOME RUBBER COMPANY
Factory & Main Office
TRENTON, N. J.

LONDON: 107 Clifton St., Finsbury CHICAGO: 168 North Clinton St. NEW YORK: 80-82 Reade St.

LIQUID LATEX

NORMAL and CONCENTRATED

Agents in U. S. A. for Dunlop Concentrated
60% Latex, Product of Dunlop Plantations, Ltd.

CHARLES T. WILSON CO., INC.

99 WALL STREET NEW YORK, N. Y.

BROCKTON TOOL COMPANY

103 Belmont Street QUALITY MOULDS FOR ALL PURPOSES Brockton, Mass.

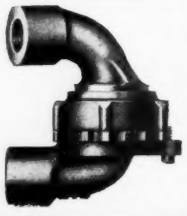
THE FIRST STEP — A QUALITY MOULD

FLEXO

FLEXO JOINTS

—for year in and year out service

FLEXO SUPPLY COMPANY, 4218 Olive Street, St. Louis



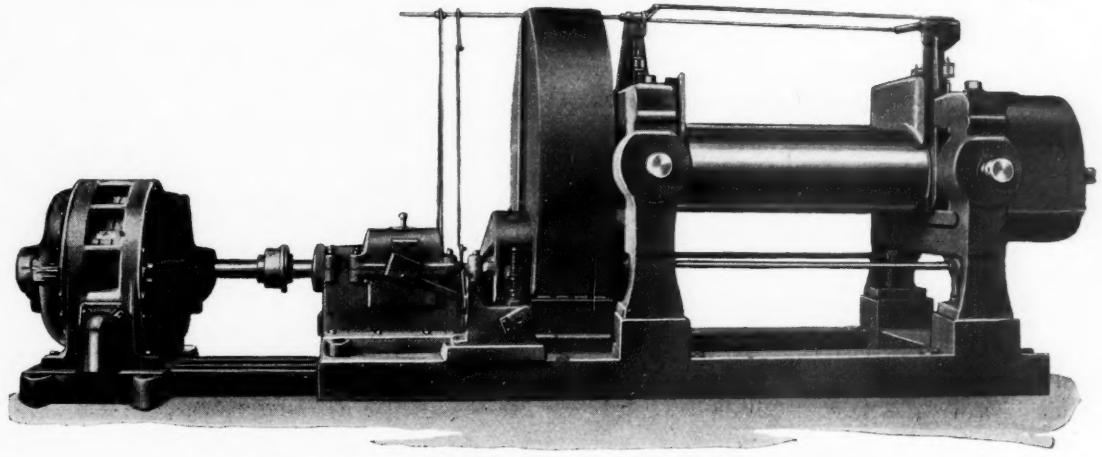
NEOPHAX VULCANIZED VEGETABLE OILS FOR NEOPRENE

"NEOPRENE can be loaded with FACTICE and fillers to a greater extent than rubber and yet retain its rubber-like properties to a remarkable degree. Such stocks tube smoothly and rapidly, calender nicely at low heats and, when vulcanized, give snappy, rubbery stocks."

THE STAMFORD RUBBER SUPPLY CO. STAMFORD CONN.

Makers of FACTICE Since 1900

*Trade Mark Reg. U. S. Pat. Off.



THROPP 60" INDIVIDUAL MOTOR-DRIVEN EXTRA
HEAVY DUTY 14" DIAMETER NECK MILL
CONSTRUCTED TO STAND HARD, CONTINUOUS SERVICE

Write for Folder on Details of Operation and Prices

WM. R. THROPP & SONS CO. • • • TRENTON, N. J.

Numerous Refinements Gained by 50 Years' Experience in Manufacturing Rubber and Plastic Equipment

PROCEEDINGS OF THE RUBBER TECHNOLOGY CONFERENCE

The 103 papers and individual discussions presented at the International Conference under the auspices of the Institution of the Rubber Industry in London, May 23-25, will be included in one volume of over 1,000 pages.

The papers as listed in our July, 1938 issue originated throughout the world and constitute a comprehensive coverage of recent technical developments in the rubber industry.

This book will be an invaluable addition to the library of every rubber technician.

Available approximately September 30.

Price, postpaid, $12.00

INDIA RUBBER WORLD

420 LEXINGTON AVENUE NEW YORK, N. Y.

TIRE MOLDS

AND MOLDS FOR RUBBER SPECIALTIES AND MECHANICAL GOODS

machined in a large modern shop at low prices by specialists in the field. We also build special machinery to your drawings.

Submit inquiries for low quotations.

THE AKRON EQUIPMENT CO.
AKRON - OHIO

The term
"COTTON FLOCKS"
does not mean cotton fiber alone

EXPERIENCE
over twenty years catering to rubber manufacturers

CAPACITY
for large production and quick delivery

CONFIDENCE
of the entire rubber industry

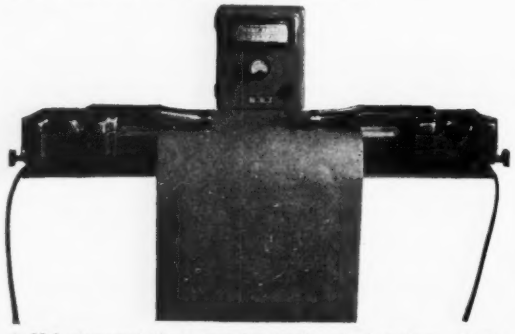
KNOWLEDGE
of the industry's needs

QUALITY
acknowledged superior by all users are important and valuable considerations to the consumer.

Write to the country's leading makers for samples and prices.

CLAREMONT WASTE MFG. CO.
CLAREMONT N. H.
The Country's Leading Makers

IMPROVED
COMPLETE ELECTRIC CALIPER GAUGE
ARRANGED FOR CONTINUOUSLY GAUGING BOTH EDGES OF SHEET MATERIAL

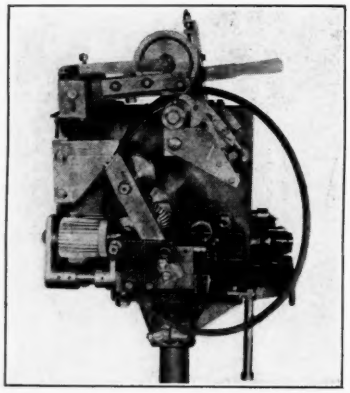


AN instrument that pays for itself out of savings. Used and indorsed by leading manufacturers for 10 years. Continuous gauging insures uniformity of product, reduces production costs, and increases efficiency generally. Far superior to irregular hand methods.

Ruggedly constructed with practically nothing to wear out. Easily adjusted to various thicknesses of material. Write us regarding your production problems. We shall be glad to make a complete analysis of your requirements.

THE MAGNETIC GAUGE CO.
60 EAST BARTGES STREET AKRON, OHIO
Eastern States Representative
BLACK ROCK MFG. CO., Bridgeport, Conn.
Foreign Representative
CONTINENTAL MACHINERY CO., Inc.
277 Broadway, New York, N. Y.

Utility Crimper Type Flipper
for
Truck and Large Balloon Tires



UTILITY MANUFACTURING COMPANY
Cudahy, Wisconsin

CABLE ADDRESS
"EPILOGUE" NEW YORK
Export Representative: BINNEY & SMITH CO.,
41 East 42nd Street, New York, N. Y.

QUALITY + SERVICE
... assure
SMOOTH SAILING!

CRUDE AND SCRAP RUBBER
ALSO HARD RUBBER DUST

BRANCHES
AKRON
CHICAGO
BOSTON
DETROIT
LOS ANGELES
LONDON
PARIS

H. MUEHLSTEIN AND COMPANY, INC.
122 E. 42nd STREET, NEW YORK, N.Y.

★

TO PRODUCERS OF RUBBER BOOTS AND SHOES

WE are manufacturers of the Patten Air Lift Motor driven machine used for cutting taps and soles from sheet rubber.

In the hands of competent and experienced operators this machine should cut from 3,500 to 5,000 pairs per day, producing a sole or tap with beveled edge of 27° to 90°, and is the latest up-to-date type of machine for this purpose.

We are in position to make delivery within thirty days after receipt of order.

★

WELLMAN COMPANY
MACHINISTS
MEDFORD, MASS., U.S.A.

DRYDEN RUBBER CO.

Manufacturers of

MOLDED and EXTRUDED RUBBER GOODS

also

HARD RUBBER
SPONGE RUBBER
FRICTION TAPE
SOLES and HEELS

DRYDEN RUBBER CO.
1014 S. Kildare Ave. Chicago, Ill.
Detroit Office: 2-270 General Motors Bldg.

MECHANICAL FABRIC CO.

PROVIDENCE RHODE ISLAND

MANUFACTURERS OF

RUBBER THREAD

FOR ELASTIC GOODS, MODEL AIRPLANES, NOVELTIES

GOLF BALL TAPES

AND

COMPLETE LINE OF

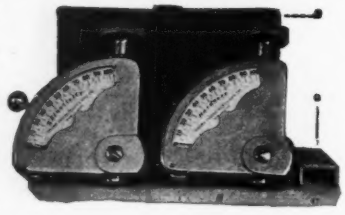
CARD CLOTHING FOUNDATIONS

Established 1890

An International Standard of Measurement for—

Hardness ✦ Elasticity ✦ Plasticity of Rubber, etc.

Is the DUROMETER and ELASTOMETER (23rd year)



These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.

It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof. *Ask for our Descriptive Bulletins, and Price List R-4 and R-5.*

THE SHORE INSTRUMENT & MFG. CO.

Van Wyck Avenue and Carll Street, JAMAICA, NEW YORK

Agents in all foreign countries.

ARCHER RUBBER CO.

Men's and Boys' Raincoats
Firemen's and Policemen's Coats (Black or White)
Blankets—Ponchos
Rubber Aprons—Baby Pants
Archer Rain Capes
Crib Sheets—Sheet Rubber
Piano and Organ Fabrics
Royal Archer Hospital Sheeting
Shoe and Slipper Fabrics
Chervel for Raincoats—Jackets—Luggage—Slippers and Specialty Uses
Leatherette—Archer Boar Hide
Chervelastic, Perfotex, Royal Archer } Corset Fabrics
Raincoat Fabrics
Custom Rubberizing
Raincoat Cements
Royal Archer Jacket Fabrics

Factory and Main Office: MILFORD, MASS.

New York—45 E. 17th St. Chicago—325 So. Market St.

The H. O. Canfield Co.

MANUFACTURE

Molded Specialties, Plumbers' Rubber Goods, Valves, Gaskets, Hose Washers, and Cut Washers of all kinds

Write for prices and samples

Offices and Works Bridgeport, Conn.

Chicago Office: 424 North Wood Street

RUBBER EQUIPMENT

Adamson mixing and moulding equipment, for the Rubber, Bakelite, Plastic, and allied industries, is built to meet modern production demands for greater accuracy, and lower cost. Every unit represents a background of investigation and factory experience that guarantees efficient operation and mechanical perfection.

AMCO ESTABLISHED 1892

The ADAMSON MACHINE *Co.*

AKRON » » » OHIO

CORONA GOLF BALL WINDING MACHINES

Used everywhere by manufacturers. Rented on a monthly basis in U. S. Sold outright in foreign countries.

Illustrated circular on request.

Corona Manufacturing Company

Mount Airy, Philadelphia, Pa., U. S. A.

Deresinated and Precipitated Surinam

BALATA

Refined approximately 99%

Purer and cheaper than you can produce it and you avoid the ever present fire risk. Dependable deliveries. Sample on request.

HUNTINGDON MANUFACTURING CO.

MEADOWBROOK, PA.

SERICITE

MOULD LUBRICANT

Pat. No. 1591767

Sole Licensed Sellers

WHITTAKER, CLARK & DANIELS, INC.

260 West Broadway, New York City

FINELY PULVERIZED—BRILLIANT

COLORS

for RUBBER

Chicago Representative FRED L. BROOKE 228 N. La Salle St.

Pacific Coast Representative MARSHALL DILL San Francisco

Cleveland, PALMER-SCHUSTER CO., 975-981 Front St.

Manufactured by

BROOKLYN COLOR WORKS, INC.

Morgan and Norman Avenues Brooklyn, N. Y.

HAKUENKA

COLLOIDAL CALCIUM CARBONATE

30 years' experience only can make "Only Colloidal Whiting in the world."

Established 1907.

SHIRAISHI SHOJI KAISHA, LTD.

TOKYO OSAKA KOBE

No. 1062 Tumorityo, Nisinariku, Osaka, Japan

CABLE ADDRESS: "CALCIUM," OSAKA

ERNEST JACOBY & CO.

Crude Rubber

Liquid Latex

Carbon Black

Crown Rubber Clay

Stocks of above carried at all times

BOSTON MASS.

Cable Address: Jacobite Boston

ELASTIC BRAIDERS

THE NEW ENGLAND BUTT COMPANY offers a complete line of high quality braiders, both the round and flat types.

Their No. 38 catalog contains valuable information on this subject and will be sent to you on request.

NEW ENGLAND BUTT COMPANY

Dept. I-9, Providence, R. I.

Chicago Office, 20 North Wacker Drive

STRENGTH where needed

The patented porcelain plug on Seville Forms, prevents loose fasteners and 90% of breakage at base.

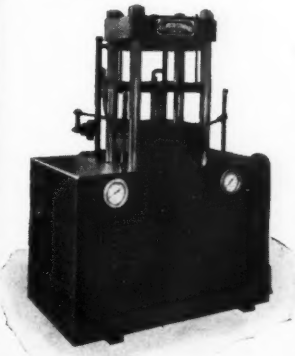
SEVILLE PORCELAIN CO.

Largest Exclusive Manufacturers of Crazeproof Vitrified Porcelain Forms

SEVILLE, OHIO

HYDRAULIC PRESSES FOR THE RUBBER INDUSTRY

Some presses that would be considered as "special" by others, are to be found in the standard line of the R. D. WOOD CO. Be sure to consult us regarding your press requirements.



(Above) An 8-opening, steam platen press operating on 2000 lbs. per square inch working pressure. Platen size—40" x 40".

(Left) A 50-ton Hydro-Lectric steam platen press with self-contained pumping unit. Pumps, motor, valves and piping are fully enclosed.

ESTABLISHED 1803

R. D. WOOD CO.

PHILADELPHIA, PA.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE

INDEX TO ADVERTISERS

This index is maintained for the convenience of our readers. It is not a part of the advertiser's contract, and INDIA RUBBER WORLD *assumes no responsibility to advertisers for its correctness.*

Page

A

Adamson Machine Co., The. 92
Akron Equipment Co., The. 90
Akron Standard Mold Co., The 16
Albert, L., & Son..... 81
American Cyanamid & Chemical Corp. 15
American Zinc Sales Co.... 10
Archer Rubber Co..... 92
Arkwright Finishing Co..... —

B

Badenhop, Robert, Corp.... 86
Baldwin-Southwark Corp.... 25
Barber Asphalt Corp..... 81
Barr Rubber Products Co., The 79
Bead Chain Mfg. Co., The. 85
Berstorff, Hermann, Maschinenbau-Anstalt G.m.b.H... 8
Binney & Smith Co..... 72
Black Rock Manufacturing Co. 85
Bridgwater Machine Co., The. —
Brockton Tool Co..... 88
Brooklyn Color Works, Inc. 92
Butterworth, H. W., & Sons Co. ..... —

C

Cabot, Godfrey L., Inc., Front Cover
Cambridge Instrument Co., Inc. 84
Cameron Machine Co..... 91
Canfield, H. O., Co., The.. 92
Carter Bell Mfg. Co., The. 84
Chemical & Pigment Co., The 85
Chicago Mold & Machine Co. 81
Chiksan Oil Tool Co., Ltd.. 83
Claremont Waste Mfg. Co.. 90
Cleveland Liner & Mfg. Co., The .....Back Cover
Colonial Insulator Co., The 83
Columbia Alkali Corp., The 87
Continental Carbon Co., Insert 12, 13
Continental Machinery Co.. 86

Page

Continental Rubber Co. of N. Y. 79
Corona Mfg. Co..... 92
Curran & Barry 75

D

Davol Rubber Co..... 87
Dryden Rubber Co..... 91
Dunning & Boschert Press Co., Inc. 81
du Pont, E. I., de Nemours & Co., Inc., Inside Front Cover

F

Farrel-Birmingham Co., Inc. 20
Flexo Supply Co..... 88
Fox, Edward 79
Franklin Research Co..... 84

G

Gammeter, W. F., Co., The 79
General Atlas Carbon Co... 23
General Dyestuff Corp..... —
General Tire & Rubber Co., The 86
Gummi-Zeitung ..... —

H

Hevcatex Corp. 22
Hoggson & Pettis Mfg. Co., The ..... —
Home Rubber Co. 88
Huber, J. M., Inc. 26
Huntingdon Mfg. Co..... 92

I

Imperial Oil & Gas Products Co. 17
India Rubber Journal..... —
Institution of the Rubber Industry ..... —
International Pulp Co..... 79

J

Jacoby, Ernest, & Co..... 93

Page

K

Kautschuk ..... —

L

La Goma ..... —
Le Caoutchouc & La Gutta Percha ..... —

M

Magnetic Gauge Co., The.. 90
Mechanical Fabric Co..... 92
Monsanto Chemical Co..... —
Moore & Munger..... 21
Morris, T. W..... 16
Muehlstein, H., & Co., Inc. 91

N

National-Erie Corp. 14
National Rubber Machinery Co. ..... —
National Sherardizing & Machine Co., The..... 81
Naugatuck Chemical Division of United States Rubber Products, Inc. 5, 18
Neville Co., The..... —
New England Butt Co..... 93
New Jersey Zinc Co., The. 6

P

Pequanoc Rubber Co., Inside Back Cover

R

Rare Metal Products Co.... 85
Revertex Corporation of America 20
Revue Générale du Caoutchouc ..... —
Robertson, John, Co., Inc... 18
Royle, John, & Sons..... 7

S

St. Joseph Lead Co..... —
Schulman, A., Inc..... 84
Scott, Henry L., Co..... 83
Seville Porcelain Co..... 93
Shaw, Francis, & Co., Ltd... 22

Page

Shiraishi Shoji Kaisha, Ltd. 93
Shore Instrument & Mfg. Co. 92
Sinclair-Collins Valve Co... 86
Skelly Oil Co..... 11
Snell, Foster D., Inc..... 79
Stamford Rubber Supply Co., The 88
Stanley Chemical Co., The. 83

T

Taylor Instrument Companies ..... —
Terkelsen Machine Co..... 79
Thiokol Corp. ..... —
Thropp, William R., & Sons Co. 89
Titanium Pigment Corp.... 19
Turner-Halsey Co..... —

U

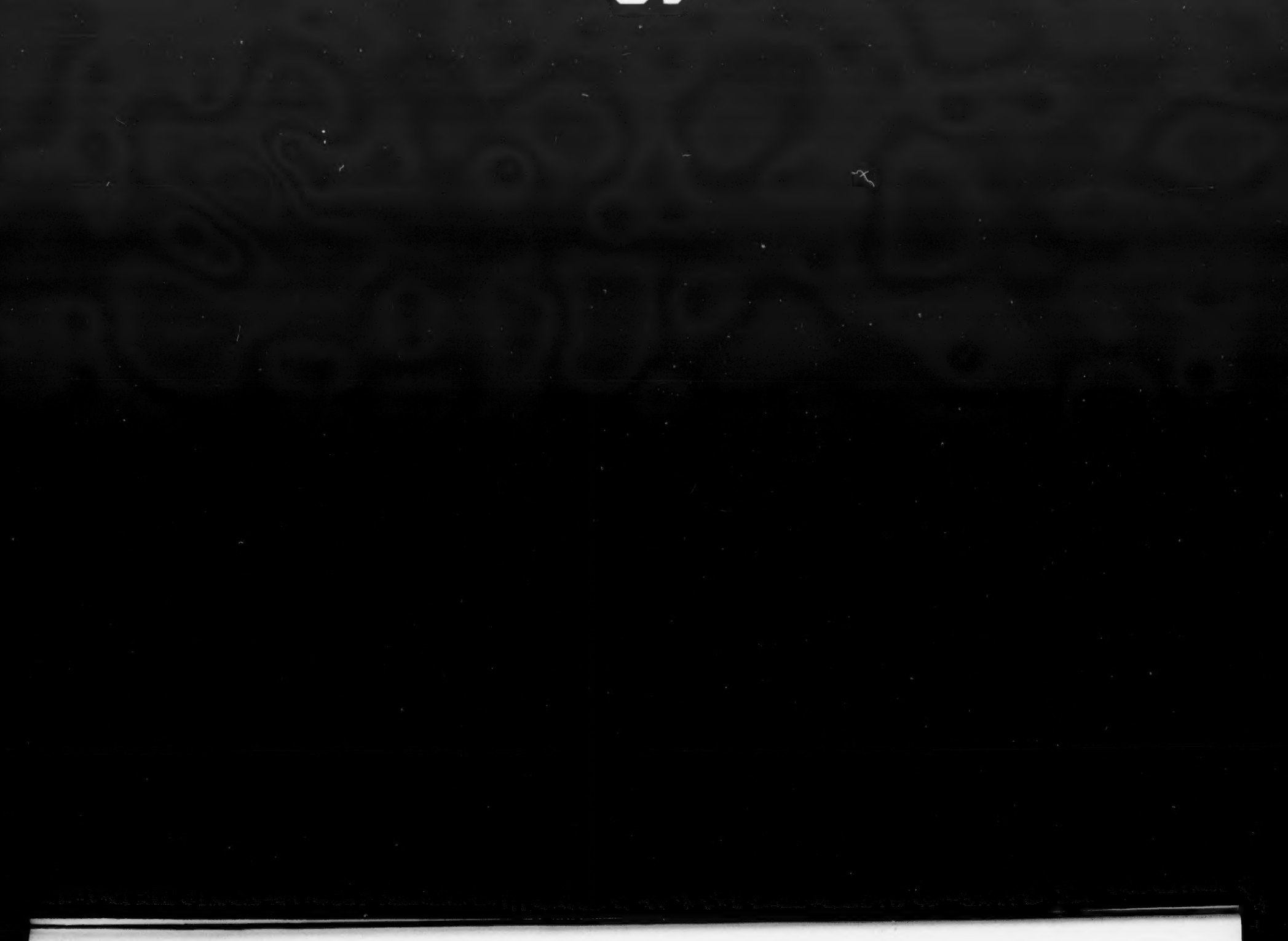
United Carbon Co..... 9
United Rubber Machinery Exchange 81
United Shoe Machinery Corporation 24
Utility Manufacturing Co... 90

V

Vanderbilt, R. T., Co..... 28
Vultex Corp. of America... 24

W

Wade, Levi C., Co..... —
Wanted and For Sale....79, 81
Wellington Sears Co..... 77
Wellman Co., The..... 91
Whittaker, Clark & Daniels, Inc. 92
Williams, C. K., & Co..... 81
Wilson, Charles T., Co., Inc. 88
Wishnick-Tumpeer, Inc..... 3
Wood, R. D., Co. 93

Y

Yarnall-Waring Co. ..... —